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# INSTRUCTIONS FOR MOUNTING USING, AND CARING FOR

# DISAPPEARING CARRIAGE

## L. F., MODEL OF 1905

AND

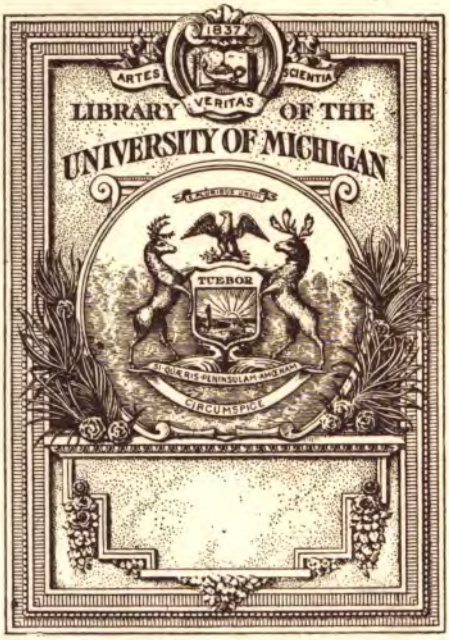
# 6-INCH R. F. GUNS

## MODEL OF 1905

(*EIGHT PLATES*)

OCTOBER 29, 1908

WASHINGTON
GOVERNMENT PRINTING OFFICE
1917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# INSTRUCTIONS

FOR

# MOUNTING, USING, AND CARING FOR DISAPPEARING CARRIAGE, L. F., MODEL OF 1905, AND 6-INCH R. F. GUNS, MODEL OF 1905.

(EIGHT PLATES.)

[The parts in *italics* are of particular importance or concern the safety of the carriage and should be specially noted.]

## GENERAL DESCRIPTION.

THE EMPLACEMENT (Plate I).—Emplacements for these carriages are entirely of concrete, and can be arranged for a maximum field of fire of 170 degrees. This limitation is not due to the inability of the carriage to traverse through 360 degrees, but to the requirements of parapet protection for the material and cannoneers. The anchor bolts are set in the concrete during the construction of the emplacement, the depressions for the thrust plates being also provided in the top surface. Access to the counterweight well is given by a vertical shaft to the rear and outside of the base ring.

THE CARRIAGE (Plates II, III, IV).—There are ten carriages of this model, numbered from 1 to 10. These carriages differ from preceding models for the same caliber guns in having the following features, viz: A single vertical recoil cylinder, retraction by gears, increased preponderance of counterweight, a counter-recoil system independent of the recoil system, gears on the recoil rollers.

Stops can be arranged so as to permit traversing either 60, 70, 90, or 110 degrees either side of the "front" of the battery, and the piece can be elevated from 5 degrees depression to 15 degrees elevation, stops being arranged to limit the depression to either horizontal or 2.5 degrees when the height of the parapet requires it.

When in the execution of mechanical maneuvers it may become necessary to traverse the piece breech to the front, which can be done with the gun in battery, the fixed stops must be removed and care exercied that the weights do not foul the flexible conduit in the pit and that the carriage is traversed back the same side so as to take out the half turn in the conduit given by the breech to the front.

The elevating system is so constructed that the gun is at an angle of about 5 degrees elevation when recoiled to the loading position from any angle of elevation in battery.

ACTION OF CARRIAGE.—Upon firing the piece the gun-lever axle is moved to the rear by the recoiling energy of the gun, carrying the top carriage with it. The lower ends of the levers move vertically upward, being constrained by the crosshead and bottom plate traveling on the vertical guides. The trunnions of the gun move downward and to the rear in the arc of an ellipse. The energy of recoil is absorbed partly by raising the counterweight and partly by the movement of the masses up the inclined chassis rails, but principally by the resistance of the recoil cylinder; and when the gun comes to rest it has the proper loading angle. After loading, the retracting clutches are released by the tripping gear, and the excees of the moment of the counterweight over the moment of the gun, etc., enables it to raise the gun to the firing position.

PRINCIPAL PARTS.—The carriage consists of the following principal parts, namely: Base ring, traversing roller system, racer, dust guards, azimuth circle and pointer, chassis and transoms, vertical guides and supporting brackets, top carriage, recoil rollers, counter-recoil buffers and buffer valve, gun levers and axle, crosshead and counterweight, recoil system, retracting gear, tripping gear, elevating system and counterbalance device, traversing system, sighting platform, sight, lighting apparatus, firing apparatus, and grease cups. The accessories consist of shot trucks, shot tongs, and implements.

BASE RING.—The base ring, 11 feet in diameter, is made of iron cast in one piece and is held in position on the foundation by twelve 1.75-inch bolts. Twelve screws for leveling the base ring are set against steel plates through which the foundation bolts pass.

The base ring, in addition to having the lower roller path on its upper surface, has an annular flange near its inner edge forming the pintle for the carriage. This flange has near its top edge a lip inward under which the clips engage, and on its top edge the azimuth circle. The inner edge of the lip is rabbeted to receive the inner dust guard. The outer annular flange on the ring projects upward outside of the traversing rollers. The cavities on each side of the roller path are drained into the pit.

Tapped holes can be found inside of the pintle flange for attaching the traversing stops in any required position.

The base ring is marked "front" in raised letters cast on the outer annular flange.

Traversing Roller System.—The racer rests and is traversed upon a circle of twenty-four live, conical, traversing rollers, whose axes are maintained in the radial position by bearings bolted to the distance ring. The rollers are of forged steel, solid, with a journal beyond each end and with flanges on their inner, small ends.

The distance ring is of cast steel in four sections bolted together. The bearings for the traversing rollers are formed with a loop on top by means of which any roller with its bearings can be lifted out of the ring through the two holes in the top of the racer.

The system is kept concentric with the pintle by the flanges on the rollers in centrifugal contact with the inner edge of the roller path on the base ring. The inner edge of the path on the racer is of a larger diameter, so as not to come in contact with the flanges.

Racer.—The racer is made of iron, 10 feet 3 inches in diameter, cast in one piece.

It is of box section, and, in addition to having the upper roller path on its under surface, has an annular flange lined with bronze near its inner edge and fitting over the pintle, with 0.04 inch diametral clearance.

Upon its top surface the chassis and transoms are bolted, doweled, and keyed.

An opening sufficiently large for removing a traversing roller is provided at each side of the racer. These holes are habitually kept covered by steel plates provided for the purpose. Four oil holes passing through the racer are provided for oiling the pintle surfaces and fourteen for oiling the traversing roller bearings. Two steel clips secured to the racer near the front and one in the rear engage under the lip inside the pintle, to prevent possible overturning. The rear clip extends downward, forming also the stop lug engaging the traversing stops and providing a bearing for the traversing pinion shaft.

Dust Guards.—The outer dust guard consists of a steel angle in four sections with its horizontal flange bolted to the outer part of the base ring. To the vertical flange is clamped a projecting strip of felt, which bears against a finished surface on the under side of the racer.

The inner dust guard is formed similarly by a strip of felt clamped to the inner upper portion of the base-ring pintle.

These guards exclude dust from the traversing rollers and roller paths. The dust-guard sections, with their felt strips, are easily removed.

Azimuth Circle and Pointer.—A brass azimuth circle, attached by countersunk screws to the top of the pintle of the base ring, is graduated in degrees, the numbers of which are to be added after the carriage is erected in its emplacement. The top of the racer is cut away on the right side to expose the azimuth circle and the micrometer pointer and the subscale, fastened to the racer. The subscale has slotted holes to give it a lateral motion for adjustment, after which it is fixed in position by two dowels. It is graduated and stamped in decimals of a degree, the least reading being 0.1 of a degree. The micrometer screw, actuating the pointer, is graduated to a least reading of 0.01 of a degree. The subscale and pointer are protected by a hinged bronze cover.

To adjust the azimuth pointer, point the gun by the bore sights on a target the exact azimuth of which is known, set the pointer to read the hundredths of a degree in the azimuth reading, loosen the securing screws, move the pointer bodily until the reference mark on its moving part exactly coincides with a degree mark on the azimuth circle, then secure in position. The degree mark should be stamped with the number indicating the azimuth bearing in degrees and the remainder of the azimuth circle should be stamped with numbers from this point as a reference.

Chassis and Transoms.—The chassis, of cast iron, are bolted, doweled, and keyed to the racer and are united at their front and rear ends by cast-steel transoms, also bolted to the racer. The rear transom carries the elevating slide and gearing. The upper surfaces of the chassis form the recoil-roller path and slope 1 degree and 20 minutes to the front to facilitate the return of the piece to the firing position.

Four steel racks in which the gears on the recoil rollers engage are secured to the upper surfaces of the chassis, one on each side of the roller path. These racks are not to be removed.

The chassis also provide the necessary bearings or supports for all the mechanism and, with the racer, supports for all the minor attachments.

Vertical Guides.—A cast-iron guide frame is bolted to the under side of each chassis opposite the counterweight. The lower ends are joined by the piston-rod beam. The inner faces of the guide frames and chassis form continuous finished surfaces, to which are bolted two vertical guides for the crosshead and bottom plate. The vertical guides extend above the chassis, and their upper ends are supported by guide brackets bolted to the outside of the chassis.

Top Carriage.—The top carriage is of cast steel in one piece. It consists essentially of two side pieces united by a transom. Two bronze bushed bearings for the gun-lever axle are formed in the upper part, to which the axle caps are bolted. On the under side are two roller paths. Four steel racks, in which the gears on the recoil rollers engage, are secured by screws to the under side of the top carriage, one on each side of each roller path. These racks are not to be removed.

Recesses are cast in each side of the top carriage near the front, in which pinch bars, inserted through openings in the guide brackets, can be engaged to force the top carriage forward against the stops, if for any reason it should fail to return fully into battery.

RECOIL ROLLERS AND ROLLER CAGES.—The top carriage rests on eighteen live recoil rollers on each side held in alignment by steel roller cages. They move to the rear with the top carriage at half its speed. The recoil rollers are of forged steel, and each alternate one has flanges which serve as guides. Each flanged roller is provided with gears which engage in the racks on the top carriage and chassis and which prevent skidding of the top carriage during recoil.

COUNTER-RECOIL BUFFERS.—A counter-recoil buffer is fitted to the forward end of each chassis roller path. The buffer cylinder is securely bolted to the chassis and on the rear face of the cylinder casting a stop is machined, against which a corresponding machined surface on the forward end of the top carriage abuts when the gun is fully in battery.

Each end of the counter-recoil buffer cylinders is closed by a stuffing box filled with hydraulic packing. Twenty-four rings of packing are furnished for each carriage, five for each stuffing box and four for replacements.

Each cylinder is provided with a filling plug located on the top, in front of the piston head in its rear position. A bronze plate, with instructions as to filling the cylinder, is secured by screws near the filling plug.

Two holes extend through the wall of the cylinder, from the lowest element of the bore, at an angle of 45 degrees downward. To these openings are coupled the pipes connecting with the buffer valve.

The openings are located longitudinally; one just in front of the rear stuffing box, so that it is always in rear of the piston head; the other 2.125 inches in rear of the front stuffing box.

The piston rod extends through both stuffing boxes. The piston, located approximately in the middle of the rod, is bronze lined and has a diametral clearance in the bore of 0.002 inch, which fact necessitates the passage of oil from one side of the piston to the other, during rapid movement, principally by way of the buffer valve, and very little directly past the piston.

On the exterior of the buffer, at its forward end, are cast two lateral horizontal lugs, one on each side. Annular projections are formed on their rear faces, centering and supporting the buffer spring covers and buffer springs, which extend to the rear alongside the hydraulic cylinder. In the center of these projections are holes, through which the buffer spring rods pass.

The buffer spring rods, of steel, are both attached at their forward ends to a buffer yoke, of cast steel, which is attached at its middle to the forward end of the buffer piston.

The rear ends of the spring rods are attached to buffer spring supports, which consist of steel sleeves, inclosing the rods, with flanges at their rear ends, fitting easily in the interior of the spring covers and supporting the rear ends of the springs. Collars are machined on the buffer spring rods, which, by seating against the front face of the buffer cylinder casting, limit the rearward movement of the piston and parts connected to it. A piston movement of 9 inches is provided for.

The action of each counter-recoil buffer is as follows:

When the gun is out of battery, the buffer springs, acting against their fixed supports in front, force the spring supports, spring rods, yoke, and piston rod to the rear until stopped by the collars on the spring rods. The buffer piston head in this position is 0.75 inch in front of the rear stuffing box. The rear end of the piston rod projects 9 inches in rear of the stop of the top carriage when in battery.

When the gun rises into battery, the top carriage strikes the projecting end of each piston rod and forces it to the front, compressing the buffer springs.

For the first 7.5 inches of piston movement, the oil in front of piston, being displaced, passes through the forward opening in the bottom of the bore to the buffer valve, and returns to the cylinder through the rear opening. The forward opening is at this point closed by the piston head, and for the remaining 1.5 inches of piston movement the cylinder acts as a dash pot, it being possible for oil to escape only around the piston head. Unless the energy of the top carriage, etc., is too great at the end of 7.5 inches of movement, due to the buffer valve not being correctly set, they will be brought to rest against the stops without jar to the carriage.

If for any reason the retracting clutches should fail to retain the gun out of battery after recoil, it is necessary, to prevent jar to the carriage, that the buffer pistons reach their rearward position before the top carriage strikes them, in order that they may do the full amount of work of retardation. The buffer springs have been designed to accomplish this, assuming that the stuffing boxes do not offer an unreasonable frictional resistance. *It is therefore important to screw up the glands only sufficiently to prevent leakage.* From the foregoing description, it is evident that it will be necessary to tighten the front stuffing box more than the rear one.

*When filling counter-recoil buffers the gun should be retracted at least 9 inches*, measured on the counterweight, as otherwise the front connecting pipes are covered by the buffer piston.

**Buffer Valve.**—Both counter-recoil buffers are joined to the buffer valve, the different settings of which enable the energy of counter recoil to be absorbed without shock to the carriage under varying conditions affecting the velocity of counter recoil. Aside from mechanical difficulties and those due to differences in the elements of loading, the following sources of variation may be mentioned: Atmospheric temperature, affecting the oil in both recoil and buffer cylinders; specific gravity of this oil (prescribed 0.85), and the loading position.

The equalizing and throttling pipes serve to connect the buffer valve to the buffer cylinders, to equalize the pressure in the buffer cylinders, and to facilitate filling them. Four plugs are furnished to close the buffer cylinders in case these pipes are damaged in action.

The buffer valve is located at the top of the oval opening in the front transom, to which it is attached by two bolts. It is accessible from the front of the carriage.

It consists essentially of a valve body, gland, disk, and handle, of bronze, and a stem of steel and bronze.

The body, which supports the other parts and provides means for attachment to the front transom, has two T-shaped chambers. The horizontal branches are coupled to the equalizing and throttling pipes, the upper leading to the forward ends of the buffer cylinders and the lower to the rear ends. The vertical branches overlap, that of the upper chamber being in front of that of the lower chamber. A horizontal hole extends from the front of the body through the vertical branch of the upper chamber and through the wall between the two branches to the rear chamber. In the hole through the wall between the chambers is screwed a steel valve seat which has a central hole, enlarging in the front face into a conical seat for the point of the valve stem. The larger part of the oil displaced in the counter-recoil buffers during counter recoil passes through this hole.

Just in front of the front and upper chamber the hole is threaded to receive a corresponding threaded portion on the valve stem, so that if the stem be turned clockwise, its conical point will bear on the valve seat and close the valve. If the stem be turned counter clockwise, the opening about its point will increase and may reach a maximum of about 0.056 square inch.

The disk is fixed to the body concentric with the stem. On the front face is an annular flange with ninety internal teeth, in which three corresponding teeth on the handle engage in order to retain the valve at any desired setting. The teeth on the disk are numbered counter clockwise from 0 to 80 at intervals of five teeth. A pin set in the face of the disk prevents the handle being turned more than 360 degrees.

The handle is a bar with a rectangular hole in the middle which fits on a corresponding portion of the stem. At one end is a pointer with teeth which engage in the teeth of the disk. An index line on the handle permits accurate setting at any desired tooth. The rectangular portion on the stem is so laid out that the handle engages at 0 of the disk when the valve is closed. The handle can be moved along the stem to permit disengaging the teeth when changing the setting. A padlock is provided in order that the valve setting may not be tampered with by unauthorized persons.

When the carriage has been erected at the fortification and a thorough knowledge obtained of its characteristics in counter recoil under all conditions, the disk should be stamped, under the direction of the Ordnance Department, at the proper points of the annular space provided for this purpose, with the words "Very hot," "Hot," "Warm," "Medium," "Cool," "Cold," and "Very cold," to facilitate setting the buffer valve.

A stuffing box is formed in the body around the stem in which four rings of packing are placed.

An emptying plug is located at the bottom of the valve body which serves to drain the buffer cylinders.

The setting of the buffer valve is best determined by trial. The setting of the recoil valve should be considered in setting the buffer valve. With a higher setting of the recoil valve, counter recoil will be more free, and consequently the buffer-valve setting should be lower. The following data are given as a rough guide in setting the buffer valve before more definite knowledge has been gained by trial:

| Atmospheric temperature F. | Buffer-valve setting. |
|---|---|
| 0 to 30 | 80 to 45 |
| 30 to 60 | 45 to 20 |
| 60 to 80 | 20 to 15 |

GUN LEVERS AND AXLE.—The gun levers support the gun at its trunnions in bronze-bushed bearings at their upper or rear ends; and the crosshead, counterweight, bottom plate, and recoil cylinder in bushed bearings at their lower or forward ends. The arms of the axle pass through the bores in the gun lever, project beyond them, and rest in the bearings of the top carriage.

CROSSHEAD AND COUNTERWEIGHT.—The crosshead is a steel casting, which serves to attach the counterweight to the gun levers, and through the guide clips bolted to both sides of it, together with similar clips cast on the bottom plate, constrains the counterweight to move vertically, preserving the alignment of the recoil cylinder.

The gun lever pins, of forged steel, are inserted from the inside of the crosshead, through the bearings in the gun lever. A key covers a segment of the inner end of each, and is secured at both ends to the face of the bearing in the crosshead, serving to prevent the gun lever pin from working out of place. A tongue on this key rests in a groove in the gun lever pin and prevents rotation. Each pin is tapped axially at its inner end to receive the extractor used to withdraw it.

The guide clips are keyed longitudinally to the crosshead, and for the upper 16 inches of their length are secured by bolts pinned and permanently finished in place.

On the rear flange of each guide clip is machined a rack in which the retracting pinions engage.

There is a finished hole in the center of the crosshead in which the upper end of the recoil cylinder fits closely for alignment.

In each corner of the crosshead are bored vertical holes, through which the four suspension rods depend. These rods are secured to the crosshead by castellated nuts with split pins, which draw the shoulders on the rods firmly against the finished under surface of the crosshead. In a similar manner there is attached to the lower ends of the rods the bottom plate, on which rests the counterweight, and to which is attached the recoil cylinder.

Guide clips are cast on the bottom plate which correspond to those attached to the crosshead.

On the bottom plate is piled the counterweight, consisting of eleven cast-iron weights; six are about 4,000 pounds each, forming the first six layers. The seventh layer consists of three weights, a total of about 2,000 pounds, the inner placed under the crosshead with an outline and upper surface corresponding to the rods on the crosshead and two outer ones held in place by T slots which engage over similar projections cast on the front and rear sides of the crosshead. The eighth layer, of about 1,500 pounds, consists of two weights in front and rear of the crosshead, of the same shape as the outer weights of the seventh layer, and held in place by projections on the bottom, which seat in depressions on the upper surface of the weights below.

The eighth layer and the outer weights of the seventh layer can be removed without disturbing the crosshead; the others can not.

*It is not intended that counterweight should be removed or added to regulate counter-recoil, and none is provided for this purpose.*

The total weight attached to the gun levers, including crosshead, counterweight, bottom plate, and recoil cylinder filled with oil, is about 35,000 pounds. The weights alone amount to approximately 27,000 pounds. The preponderance of the weight of the counterweight, etc., over the weight of the gun is approximately 15,000 pounds.

RECOIL SYSTEM (Plate VIII).—The energy of recoil is absorbed principally by a single vertical hydraulic cylinder moving with the counterweight, and a piston and rod secured at its lower end to the middle of the piston, rod beam.

Recoil is varied to meet varying conditions of atmospheric temperature, velocity of projectile, etc., by means of a recoil valve, contained in the piston rod.

The principal parts of the recoil system are: The recoil cylinder; the upper and lower cylinder heads, with stuffing boxes; drain plug; filling plug; piston and rod; valve stem and body; locking disk; hasp and hasp bracket; piston-rod bracket; and recoil indicators.

The recoil cylinder of forged steel has two throttling grooves cut on its interior at opposite ends of a diameter. These grooves are of variable cross section in order to oppose a constant resistance to the energy of recoil of the carriage. The two ends of the cylinder are closed by the upper and lower cylinder heads.

Narrow copper gaskets $\frac{1}{16}$ inch thick, seated in recesses at both ends of the cylinder, are compressed in securing the cylinder heads, sealing the joints against oil pressure.

Around the bore of each cylinder head a stuffing box prevents the escape of oil by the piston rod. Each stuffing box requires six rings of hydraulic packing 0.5 by 0.5 inch square. Eighteen rings are issued with each carriage, six being for reserve.

In the lower cylinder head is a recess 5.25 inches in diameter. On the piston below the head is a corresponding enlargement which enters this recess with slight clearance. If at the end of recoil the energy has not been normally absorbed, these parts, acting as a dashpot, provide a safeguard against possible injury to the carriage.

The filling and drain holes are in the upper and lower cylinder heads, respectively. The filling and drain plugs are alike and in the form of tap bolts; two additional are supplied for reserve.

The piston and rod are of forged steel in two pieces, the lower part of the rod being formed in one piece with the piston. The lower end passes through a hole in the piston-rod beam. Two nuts engage on threaded portions of the rod above and below the beam, cylindrical portions on them seating in counterbores in the beam, thus aligning the rod. The upper nut is secured by a taper pin; the lower is castellated and secured by a split pin.

The upper end of the rod is bored axially to receive the stem and body of the recoil valve. At the piston, two grooves surround the bore. Four holes radiate from each of these grooves, one set opening on each side of the piston. Oil can therefore pass from one side of the piston to the other in two ways, namely, by the outside of the piston head through the diametral clearance of 0.02 inch and the throttling grooves, and through the two sets of radial holes.

Passage through the radial holes is restricted by the recoil valve body. This is a bronze bar fitting closely in the piston-rod bore, opposite the piston. It has a diametral slot 0.4 inch wide, 1.625 inches long, and 1.375 inches from the lower end. With the recoil valve open, this slot reaches from one groove to the other. As the valve body is withdrawn upward, the portion of the slot open to the lower groove decreases to zero, when the passage between the two sets of radial holes is closed.

At the upper end of the piston a bronze valve stem nut is screwed into the bore and secured by a nut-locking screw. A slot in the upper end of this nut affords means of removing and inserting it with the tit wrench provided for this purpose.

The vlave stem is a steel rod connecting the valve body with the valve-stem nut for the purpose of actuating the former. The upper end of the valve stem has a flatted portion over which the locking disk is seated and on which the wrench for the recoil valve engages. This wrench is provided on one end of the tit wrench for the valve-stem nut. In order to remove the valve the valve-stem nut must be taken out.

The locking disk is of steel 3.5 inches in diameter and has eleven notches on its circumference to indicate the open, closed, and nine intermediate positions of the recoil valve. These notches are numbered from 0 to 10, inclusive.

When the shoulder on the valve stem stops against the lower end of the valve-stem nut, the 0 notch is toward the front of the carriage and opposite the hasp, and the bottom of the slot in the valve-stem body is 0.25 inch above the lower groove in the piston-rod bore. When the disk is turned clockwise 90 degrees, the valve stem descends 0.25 inch and brings the bottom of the slot to coincidence with the upper edge of the lower groove. A further movement of 18 degrees uncovers the lower groove 0.05 inch, or an area of 0.02 square inch, and brings the first notch of the locking disk opposite the hasp. Similarly, each additional notch opens the passage through the piston 0.05 inch. When the tenth notch is opposite the hasp, the lower groove is uncovered 0.5 inch and the valve is open.

The upper end of the piston rod is flatted to retain it in a fixed position with respect to rotation. A piston-rod bracket of cast steel maintains the upper end of the piston rod in alignment.

The hasp bracket is bolted to the piston-rod bracket in front of the piston rod, seating against the flatted portion on the latter. The hasp, by engaging in notches on the locking disk, retains the recoil valve at any desired setting. A flange on the top of it prevents the locking disk from moving vertically when the hasp is engaged. A slot in the hasp passes over a lug on the hasp bracket, after which a padlock is secured to the lug preventing any unauthorized change in the setting of the recoil valve.

A filling plug instruction plate is secured to the crosshead near the filling plug, so as to be visible from the front of the carriage.

The normal recoil is 49.79 inches; a further recoil of 0.928 inch is possible. During this additional recoil, the recoil buffer previously described would act to bring the carriage to rest without shock. An indicator to measure the recoil is secured to the inside of each chassis so as to be visible through oval openings in front of the chassis. Numbered graduations are cast on it at intervals of 1 inch. Pointers are attached to the front surface of the guide clips.

The recoil valve is the only means provided for varying the length of recoil, *and no attempt should be made to use other means for this purpose. Although the setting of the recoil valve slightly affects counter recoil, it should not be used to regulate the latter movement.*

When more definite data are not available, the valve setting for the first round at full charge should be:

| Atmospheric temperature. | Recoil valve setting. |
|---|---|
| Below 30° F. | 9 |
| 30 to 70° F. | 8 |
| Above 70° F. | 7 |

A careful record should be kept of recoil-valve settings for each carriage, in a form convenient for their study for guidance in future firings.

*For firings with all charges, the recoil cylinder should be filled to the level of the filling hole with the oil issued for this purpose, and frequent inspections should be made of the lower stuffing box during firing to guard againt leakage of oil.* If escape of oil occurs, the cylinder should be refilled and the cause of leakage remedied.

RETRACTING GEAR (Plate VI).—The retracting system enables the gun to be retracted from the firing to the loading position when desired. The effort required is the greatest at the start and steadily diminishes.

Retraction is by hand power only. Power is applied to cranks on each side of the carriage. The extremities of the shaft on which the cranks engage are square, and the cranks are secured by spring catches, making them easily removable. Power applied to the cranks is transmitted through trains of gearing on each side of the carriage to pinions engaging in the racks on the guides. These pinions are connected with the remainder of the gearing by retracting clutches and are free to revolve on their supporting shafts when the clutches are disengaged. This makes tripping of the carriage possible.

The retracting crank shaft is of steel supported in each chassis. Two bronze spur pinions of fifteen teeth are keyed to it inside of the chassis and engage in cast-iron intermediate gears of eighty-six teeth which are keyed to the retracting intermediate shaft. Two forged steel intermediate spur pinions of fifteen teeth are keyed to the extremities of the shaft outside of the chassis. They engage in the retracting pinion shaft gears which are keyed to the retraction pinion shafts on each side of the counterweight. The retracting pinion shafts are each supported in two bearings, the clutches and retracting pinion being between them. The outer bearing, called the retracting pinion shaft bearing, is bolted to the chassis. The inner bearing is a projection formed on the top of each guide frame. A guard secured to the chassis surrounds and protects each retracting pinion shaft gear. Each retracting pinion shaft has securely keyed to it a retracting clutch sleeve. The inner end of the sleeve supports the retracting pinion. On the outer end of the pinion are twenty-eight radial teeth of triangular profile, one face of each tooth being in an axial plane. These teeth engage in corresponding teeth in the retracting clutch. This part is of forged steel, secured to the retraction pinion shaft by fourteen slots on its interior, engaging over feathers machined on the shaft. Longitudinal movement is permitted, enabling the clutch teeth to be disengaged. A short helical spring, supported by a flange on the outer end of the retracting clutch sleeve, forces the retracting clutch inward to keep the teeth in engagement. A bronze retracting pinion collar placed between the retracting pinion bushing and the feathers of the retracting clutch sleeve is notched for engagement with these feathers, thus preventing the bushing from bearing on the ends of these feathers in rotation.

Dust guards protect the clutch teeth and the retracting clutch spring, together with the parts inclosed by it.

When the counterweight rises the clutch teeth, due to their shape, ride over each other, permitting independent rotation of the retracting pinion. When the counterweight starts to descend the teeth engage and the effort is transmitted through the retracting gearing to a ratchet wheel keyed to the retracting crank shaft outside of its bearing in the left chassis. Two steel ratchet pawls pivoted on the chassis engage the ratchet wheel by their own weight. *The retracting cranks should be removed and placed on the chassis hooks provided for them when they are not actually in use.*

Bearings of the shafts of the retracting gearing are provided with roller bearings. Longitudinal motion is in general prevented by thrust collars pinned to the shaft and having grooves filled with felt which protects the roller bearings from dust. Ample means for lubrication are provided, *and it is important that parts of the retracting gearing be kept well lubricated.*

TRIPPING GEAR (Plate VI).—Tripping gear, including the safety latches and their pawls, is for the purpose of releasing the retracting clutches against the action of their springs and allowing the gun to rise into battery; of automatically holding the clutches released while the counterweight is descending; and of automatically releasing the clutches and permitting them to reengage when the gun is fired.

The tripping gear consists essentially of a tripping lever and shaft; tripping rod and crank; bell crank and support; clutch-lever rod; retracting clutch levers; safety latches, handle, cranks, rods, and pawls; and latch-crank shaft.

The tripping lever is located outside of the rear of the left chassis. A shaft extends through the left chassis, resting in a bearing bolted around the inside face of an opening in the chassis. The outer end of the bearing has a sector of 158 degrees cut away. The tripping lever has a corresponding sector of 76 degrees. This permits a rotation of the tripping lever of 82 degrees. In its downward position it is inclined to the rear 38 degrees from the vertical. Its weight retains it in its lowest position.

The tripping-rod crank is in two pieces assembled over the ends of a ball pin.

The bell crank is attached to a vertical pivot at the junction of its three branches. The pivot is supported by the bell-crank support attached to the inside of the left chassis.

The tripping rod connects the tripping-rod crank with the longest branch of the bell crank. Since the former rotates in a vertical plane and the latter in a horizontal plane, they are connected by ball joints.

On the inside and rear of the retracting pinion shaft bearings are cast supports for the fulcra of the clutch levers. The latter are steel forgings with a fork at the forward end engaging in a groove on the exterior of the retracting clutch. The extremities of the fork bear on the sides of the groove at the top and bottom in disengaging the clutch. The clutch levers are pivoted at a point 6 inches in rear of their contact with the retracting clutches. Their rear ends are joined to two branches of the bell crank—that of the left directly, and that of the right through the clutch-lever rod.

The two safety latches are pivoted just inside of the web of the chassis on one of the through bolts securing the guide frames to the inside of the chassis. Each consists of a lever pivoted in the middle. The lower branch extends downward and to the front, and when the clutches are engaged it rests against the upper extremity of the fork of the clutch lever. The upper branch extends upward and to the front to the safety-latch pawl. The latter is seated in a recess in the upper rear face of each guide clip. It is pivoted at the bottom, and under the action of a flat spring a portion of it projects from the rear surface of the guide clip, which is so shaped that when it strikes the upper branch of the safety latch from below the latter is forced upward; when it strikes it from above the pawl is pushed back into its recess and passes the latch without moving the latter.

A lug on the upper branch of each safety latch is connected to the safety-latch rod. Collars pass over one end of this rod, having between them a helical spring which acts against a lug on the chassis so as to force the rod forward, rotating the safety latch downward and to the front, until it strikes the end of the clutch lever, in case the clutches are engaged, or until the safety-latch handle strikes its stop, in case the clutches are disengaged.

To the rear end of the safety-latch rod are attached safety-latch cranks pivoted on a latch-crank shaft. This shaft extends across the carriage, resting in bearings in the chassis. To the left end outside of the chassis is keyed a safety-latch handle. A lug projecting from its pivoted end bears on a stud screwed in the chassis, which forms a stop against the movement of the safety latches under the action of their springs.

The action of the tripping gear is as follows: When the tripping lever is rotated upward, the rear ends of the clutch levers are rotated inward and the fork ends outward, the latter carrying with them the retracting clutches. This movement frees the retracting pinions and the counterweight, the latter descending and the former rotating freely on their shafts. When the clutches are released and the forks of the clutch levers have moved outward sufficiently to clear the lower branches of the safety latches, the latter are rotated to the rear under the action of their springs and engage inside of the clutch levers, preventing them from returning to their original position under the action of the clutch springs and the weight of the tripping lever. The tripping lever is thus prevented from dropping and gives a clear indication of whether or not the safety latches have engaged.

The seriousness of the safety latches not engaging, which will permit the retracting clutches to reengage during counter recoil, is apparent. *Great care should be taken to raise the tripping lever to its full limit of upward movement in order that the safety latches may engage. Before releasing the hold on the tripping lever a slight downward pressure on it will show whether or not the latches have engaged.*

After counter recoil, the safety-latch handle may be raised, releasing the latches, and the tripping lever lowered to its original position. Or if the gun be fired with the safety latches engaged, the safety-latch pawls approaching the latches from below will automatically release them and the tripping lever will fall. The safety-latch handle must be raised, releasing the latches and retracting clutches, before the gun can be retracted. The tripping lever should be habitually in its lowest position.

The parts of the tripping gear connecting the tripping lever with the retracting clutches are not designed to support weight, and should not be used as a foothold by one passing over the interior of the carriage.

THE ELEVATING SYSTEM (Plate VII).—The gun is moved in elevation by turning an elevating handwheel, which is connected through its shaft and bevel gears to a screw fixed to the rear transom.

A moving nut on the screw is connected with the lower end of the elevating arm, whose upper end is attached to the gun 66 inches in rear of the trunnion. An elevating handwheel is also provided on the left sighting platform.

(NOTE.—This model carriage was manufactured with the elevating handwheels arranged as stated here, but they will be changed so as to remove the handwheel from the platform and to replace it by a slow-motion handwheel located near the elevation scale.)

The elevating system consists of the elevating band and arms, slide, slide nut, slide spring, screw, shaft gears, shaft, handwheel; also the elevation and range scale and pointer, the counterbalance device, and the slow-motion gearing.

The elevating band seats in a groove in the gun. On the extremities of a horizontal diameter are band trunnions, which are inserted after the elevating arm is in position.

The elevating arm is connected at its lower end to the elevating slide by means of the elevating pin, which is inserted through bronze bushed bearings in the slide and through a hole in the elevating rod. At its upper end it is connected to the elevating band.

The elevating slide consists of two side pieces connected by transoms. Along the lower edges are bronze-lined flanges. In the rear transom are planed guide ways for these flanges. The slide is held in place by cast-steel gibs bolted to the rear transom. To the side of the right guide way is bolted the elevating stop.

Due to the severe downward shock received through the elevating arm when the gun is fired, the thrust is transmitted from the elevating slide to the slide nut by a helical spring surrounding the slide nut. It is compressed between the flange on the lower end of the nut and the upper transom of the elevating slide. In order that the elevating slide and slide nut shall have the same relative position at all times, except when the spring is compressed by firing, a spring compressing nut is screwed into the lower transom of the slide, with its upper end bearing on the bottom of the slide nut. The spring compressing nut is set up so as to give the spring an initial compression, which will positively return the compressing nut to a bearing against the slide nut after the spring is compressed by firing. This initial compression is given during the shop test of the carriage, and a taper pin is inserted in the elevating slide through a hole in the flange on the head of the compressing nut. *In case the nut should later be removed, care must be exercised that it be returned to exactly its original position, as the zero of the elevation scale will otherwise be thrown out of adjustment.*

The elevating shaft is located at the rear and left side of the carriage. It rests in three roller bearings, one in the left chassis and two in the lugs cast on the middle of the top of the rear transom. To the outer extremity is keyed the elevating handwheel shaft of wrought iron with cast-iron hub. Between the two inner bearings of the shaft is keyed a forged steel elevating shaft bevel pinion engaging in the gear on the elevating screw.

The elevation and range scale and pointer is for the purpose of indicating the elevation of the gun, both in degrees and yards of range, for a given weight of projectile and muzzle velocity. It consists principally of a base, cover, slide, range and elevation scales, and dog.

The base is of cast iron with six lugs on the under side by which it is bolted to bosses on the rear transom. Its length is parallel to the guideways in the rear transom, but its surface is inclined so as to be visible to one standing at the elevating handwheel. The cover is of the same form as the base and is secured to it by 11 tap bolts. A longitudinal groove in its under surface accommodates the bronze slide, together with the elevation and range scales riveted to it. A lug cast on the inner side of the slide projects below the base through a slot between it and the cover. The elevation and range scales are of German silver riveted to the upper surface of the slide, elevation scale on the right.

The dog is bolted to the left side of the elevating slide and extends to the left so as to be clamped between two adjusting screws on the lug of the slide. This causes the slide and elevation slide to move as one and provides a means of adjusting the elevation scale to read 0 when the gun is at 0. The elevation and range scales are visible through an opening in the cover. German-silver index plates, marked "0," are set in the cover on each side of the opening, at which the readings of the scales are taken. The elevation scale is graduated by transverse lines to a least reading of three minutes from $-5$ degrees to $+15$ degrees; the range scale is similarly graduated to a least reading of 50 yards. The opening in the cover is provided with a pointer lid.

The counterbalance device tends to equalize the force required for elevating and depressing, with the gun in the loading as well as in the firing position.

The weight descends vertically into the counterweight well as the gun is depressed.

All gears of the elevating system are provided with cast-iron gear covers in halves bolted together. Oil plugs in them provide easy means of oiling the gears. Roller and other bearings are also provided with ample means of lubrication.

TRAVERSING SYSTEM.—The traversing system enables the racer and parts supported by it to be easily and quickly moved in azimuth on the traversing rollers, either from the working platform or from the sighting platforms.

Traversing is accomplished by rotation of the traversing pinion which is attached to a vertical shaft at the rear of the carriage, and engages in a steel rack fixed to the interior of the base ring.

The traversing system consists principally of gearing for rapid movement from the working platform at the right side of the carriage, and of slow-motion gearing for smooth slow movement, as in following a target. It is composed of traversing rack, pinion, pinion shaft, crank shaft, and gears.

The traversing rack is of six sections joined in such a manner that they can be easily removed individually, and secured to the base ring by screws set below the surface of the bottom of the teeth. Traversing pinion is keyed and secured by a castellated nut to the traversing pinion shaft. The latter has two roller bearings and one ball thrust bearing in the rear clip and traversing bracket, which is a steel casting bolted to the rear transom and to the racer. It also provides two roller bearings for the traversing crank shaft, to which is keyed a forged steel traversing crank shaft bevel pinion, which engages in a cast-iron gear keyed and secured by castellated nut to the upper end of the traversing pinion shaft. A traversing crank is secured by a spring-retaining catch to the right extremity of the crank shaft outside of the chassis. The traversing crank is easily removable, and hooks for it when not in use are provided on the chassis.

The slow-motion handwheels are placed one on each sighting platform. They are connected by gearing and shafts to the traversing shaft.

(Note.—The carriages were manufactured as described. They will be altered so as to have a traversing handwheel on the left platform only. A clutch will be provided so that the handwheel can be thrown out of gear while the carriage is being traversed from the working platform.)

Sighting Platforms.—Two sighting platforms are provided, one on each side of the carriage.

The carriage can be traversed from both platforms; the gun can be elevated or depressed from the left platform only.

(The carriages will be altered so as to remove the elevating handwheel from the left platform and to allow traversing from that platform only.)

Sight.—Two sights are provided, one on each sighting platform. The sight with which the carriages are equipped is the 3-inch telescopic sight, model of 1904, which, together with its cradle and sight arm, is described in Form 1955. The sight arm is mounted on a sight arm bracket, which is in turn mounted on the upper end of the sight standard.

The sight standards are of cast steel. The upper end of the sight standard is turned to a diameter of 6.497 inches for a height of 6 inches, below which is a flange with two set screws in front screwed into lugs 2.5 inches apart. The sight-arm bracket is of cast steel with a socket at the rear, bored to fit the upper end of the sight standard. An arm projects to the front 25.44 inches, having at the extremity a double bearing for the sight-arm bracket pin, which passes through the hole in the forward end of the sight arm. A lug at the base of the sight-arm bracket is engaged by the set screws of the sight standard, which enables the line of sight to be brought into exact parallelism with the bore of the gun with respect to azimuth. To make the adjustment, point the gun at a distant object (about 6,000 yards away, if practicable) by means of a bore sight, set the deflection scale of the telescopic sight at 0, then bring the sight on the target by means of the set screws. Four tap bolts are screwed into the sight standard through holes in the flange at the base of the sight-arm bracket. These holes are 0.188 inch in diameter larger than the bolts, which allows sufficient play to make the desired adjustment, after which the screws should be tightened and the adjustment verified.

Two lugs project upward from the rear of the sight-arm bracket and afford a double bearing for a second sight-arm bracket pin passing through the sight arm. In this case, the cradle movement in elevation is merely for the purpose of bringing the target into the field of the telescope.

(NOTE.—The carriages will be altered so as to have only one sight, located on the left sighting platform.)

LIGHTING APPARATUS (Plate VIII).—Plate VIII shows the plan of the electrical equipment and the wiring diagram.

The power for lighting is obtained from the power mains of the emplacement through lead-covered cables which enter a terminal box at the rear of the pit. From that point it is distributed by insulated wires with flexible metallic and insulated wrought-iron pipe conduits to two 8-candlepower lamps, one at the azimuth pointer and one at the elevation pointer; to three 16-candlepower lamps, one on each chassis and one at the center of the carriage; to one portable 16-candlepower lamp at the front transom; and to two 2-candlepower lamps on the telescopic sight. The 2-candlepower lamps are for the illumination of the cross wires, the deflection scale, and the range drum. All lamps are 110 volts in parallel. Where emplacements are equipped with power at 220 volts, lamps are placed two in series.

The azimuth and elevation pointer lamps, as well as those for illuminating the sights, are controlled by a single snap switch on the lamp fitting of the elevation pointer lamp at the rear of the carriage; the chassis lamps and the lamp in the center of the carriage are provided with key sockets for their control. The portable lamp has a snap switch on its base. Cross wires of the sight are provided with a mechanical dimmer by which the lamp is occulted to any desired degree.

The portable water-tight lamp shown on the front general view is for the purpose of setting the recoil valve and buffer valve and for any other use within its reach. The lamp itself is covered by a globe of heavy glass seated in a bronze base to which is attached a handle. The flexible steel conduit containing the conductors passes through this handle. A substantial wire guard surrounds the globe and is attached to the base, with a hook at the end for hanging the lamp on the front of the carriage.

FIRING APPARATUS.—The gun may be fired either electrically or by lanyard. The current for firing electrically is obtained from a battery of dry cells carried in a box supported in a bracket attached to the underside of the sighting platform. The firing circuit is closed through a firing pistol mounted on the shoulder rest above the left sighting platform.

In order that the gunner may determine whether the circuit is complete without actually firing a primer, the pistol is provided with a buzzer attachment. By pressing a projecting button on the pistol the firing circuit is made through a coil of high resistance, which, with the voltage ordinarily used, permits the passage of sufficient current to operate the buzzer but not sufficient to endanger the firing of the primer.

A circuit breaker on the breech of the gun prevents the possible firing of the gun electrically except when the breechblock is fully closed, whether the gun be in the loading or in the firing position. A safety firing switch on the carriage prevents the possible firing of the gun electrically except when fully into battery or nearly so. This device consists of a double-pole, single-throw switch, the parts of which are separated by the recoil, one part being attached to the chassis, the other part to the top carriage. The part attached to the chassis is so arranged that when the top carriage recoils it drops out of position, so that on counter-recoil contact is not made until this part is raised into position by a lever on the outside of the left chassis.

The gun is fired by a lanyard from the loading platform. A safety device has been added to prevent the possible firing of the gun by lanyard except when fully in battery or nearly so. The device consists of a short lanyard running from the primer to a ring at the end of a copper cable wound on a reel. The reel is carried in a housing attached to the rear face of the elevating band on the gun. One end of the firing lanyard is attached to the ring on the copper cable, the other is held by the cannoneer who is to fire the piece. The short lanyard can be pulled to the rear so as to fire the primer only, by first unwinding the copper cable from the drum. This is prevented while the gun is from battery by the action of a pawl which engages a ratchet on the drum. When the gun rises into battery this pawl is automatically tripped by a cam attached to the rear face of the elevating arm. This permits the reel to be unwound and the pull to thus come upon the short lanyard attached to the primer.

The reel is provided with a spiral spring which causes it to rotate and wind up the copper cable as soon as the pull upon the lanyard is released. The initial tension of this spring should be such as to cause the copper cable to be wound up with certainty with the lanyard attached. Should the initial tension be much in excess of the proper amount, the spring may become wound solid before sufficient cable has been unwound to permit the firing of the primer. Too much tension on the spring is otherwise objectionable, since it brings unnecessary strains on the parts when the reel automatically winds up.

Should the tension of the spring require adjustment, it may be done as follows: Loosen the nut on the spring shaft projecting from the center of the case; hold with a screw wrench the square end of the shaft to prevent the spring from unwinding; remove the spring shaft pin, and, by means of the wrench, turn the spring shaft in such direction as to increase or decrease the tension as required. Holes are provided wherein the pin may be inserted at any quarter turn of the shaft.

A safety device on the firing mechanism proper prevents possible firing of the primer by lanyard until the breechblock is locked, whether the gun be in the loading or in the firing position.

Shot Trucks.—Four shot trucks are furnished with each carriage for bringing projectiles to the gun. Each truck carries six projectiles. They are to be taken from the truck and inserted in the gun by hand. All shot-truck wheels are equipped with rubber tires, set in grooves on the wheels and vulcanized in position.

Shot Tongs.—Each carriage is provided with seven pairs of shot tongs for handling the projectiles in the emplacements. In order to provide tongs having a small height over all and thus to increase the amount of possible hoist in the galleries of the emplacement, the tongs are designed with a lock which must be operated by hand before they will grip a projectile. This lock consists of a dog, the inner end of which presses against the top of the projectile while the outer side is held by a U-shaped piece rotated into position after the tongs have been placed on the projectile.

Grease Cups.—Eight grease cups are provided for lubricating the heavy bearings of the gun levers and the rear bearing surfaces of the vertical guides, with the heavy grease necessary for this purpose. The grease cup consists essentially of a body for carrying the grease and a cap carrying a piston actuated by a coiled spring. When the cap is screwed down over the body of the cup, the piston bears against the grease. By further movement of the cap, the spring in rear of the piston is compressed, thus putting a sustained pressure on the grease. *This cap should habitually be kept screwed down, so as to maintain a clearance of about 0.25 inch between its face and the face of the nut on the projecting piston,* affording a visible indication that the grease is being forced into the bearing.

IMPLEMENTS.—Each carriage is equipped with the wrenches, screwdrivers, lifting hooks, pinch bars, and oil cans required for its mounting and care. These parts, except those too large, are stored in an armament chest, together with the necessary implements for the gun.

# INSTRUCTIONS FOR ASSEMBLING CARRIAGE.

General Remarks.—The carriage is dismounted for shipment, the heavy parts being separated, the finished surfaces slushed and covered with boards. The chassis and transoms are sometimes shipped assembled. The small parts are disassembled sufficiently for boxing them conveniently. Except where impracticable on account of the size or other characteristics, each part bears a piece mark shown on the drawing near the designation of the part. The first number of this piece mark indicates the drawing on which the part is detailed. Where it is possible to assemble the parts in more than one way, they are sometimes marked to indicate the way in which they were assembled during shop test, as, for instance, the two ends of two distance ring sections which adjoin are marked with the same number. The shipping list itemizes the contents of each box.

The following approximate weights are given as a guide in assembling and handling the parts:

| Part. | Weight. |
|---|---|
| | *Pounds.* |
| Base ring with traversing rack | 8,000 |
| Distance ring, four sections, without rollers | 1,000 |
| Racer | 6,000 |
| Chassis, each: | |
| Model of 1905 | 6,700 |
| Model of 1905 MI | 6,000 |
| Front transom | 925 |
| Rear transom | 2,200 |
| Guide frame, each | 1,000 |
| Piston-rod beam | 750 |
| Vertical guide, each | 600 |
| Guide bracket, each | 650 |
| Sight standard | 1,050 |
| Top carriage | 2,600 |
| One roller cage with rollers | 350 |
| Bottom plate | 3,300 |
| Counterweight, largest piece | 4,200 |
| Recoil cylinder with cylinder heads | 970 |
| Piston rod | 350 |
| Cross head, with guide clips | 3,200 |
| Sighting platform: | |
| Model of 1905 | 220 |
| Model of 1905 MI | 550 |
| Elevating arm | 650 |
| Elevating band | 320 |
| Gun levers, axle, yoke, etc | 6,400 |
| Counter-recoil buffer, assembled | 350 |
| Gears, shafts, brackets, cranks, and other parts not mentioned above, about | 7,500 |
| Total weight (unboxed) about | 92,000 |

*In assembling the carriage, no part should be directly struck with a steel hammer or sledge. A wooden buffer should be used on the part to be struck, or soft-metal drifts or hammers should be used. In handling parts, care must be exercised that machined surfaces do not become burred. All bearing surfaces should be clean, smooth, and well lubricated prior to being brought together.*

The assembling of the carriage require the use of such blocking, way plank, hydraulic jacks, ropes, and pulleys as are usually found at seacoast forts. In addition to these, a derrick or shears capable of lifting 4 or 5 tons will be found very useful.

INSTRUCTIONS FOR ASSEMBLING.—Carriages should be mounted under the immediate supervision of an ordnance machinist familiar with the work, so that the following instructions are intended to be general only.

BASE RING.—First fill the cavity on the under side with neat cement, after which move the base ring into position over the pit by means of the derrick or by skids and rollers, placing the part marked "Front" in the axis of the emplacement. Place a thrust plate on each holding-down bolt in such position as to receive the thrust from the leveling screws. Clean and oil the threads of the holding-down bolts, then lower the base ring, exercising great care not to burr these threads.

The base ring should be supported by the leveling screws, so as to leave an opening underneath sufficiently wide for satisfactory grouting.

LEVELING.—The base ring should be carefully leveled by means of an accurate straightedge and a well-adjusted machinist's level. The straightedge should be used on the roller path by resting it on the inner edge with no blocks or other supports. The level should be reversed in every position and the mean position of the bubble taken as the correct one.

Preliminary leveling may be done from the azimuth circle by supporting one end of the straightedge on blocking in the center of the pit, but the final adjustment should be verified by readings taken on the roller path, as described above. At the conclusion of the leveling, moderately tighten all holding-down bolts, verify the level, then add a grouting of neat Portland cement. Care must be exercised that this completely fills the entire space under the base ring. No weight should be added to the base ring until the grouting has thoroughly set. The leveling screws should then be backed off two turns.

DISTANCE RING AND TRAVERSING ROLLERS.—Carefully clean all parts, assemble the rollers in their bearings with the distance ring in place, and run the system around by hand, to see that all parts operate freely.

RACER.—Move the racer into position, clean the roller path and pintle surface, then carefully lower into position on the traversing rollers. Care should be exercised not to injuriously rub or cramp the pintle surfaces during the lowering. Assemble the outer and inner dust guards and the covers for opening in racer, in order to prevent the possible entrance of dirt or metal chips. The racer should then be run around by hand, to determine whether it be entirely free in its operation.

**FRONT CLIPS** may now be bolted in place.

**CHASSIS AND GUIDE FRAMES.**—Place either chassis in position, dowel, key, and bolt it to the racer. The rear of the racer may be identified by its being beveled for the rear transom. Lower its guide frame into position and bolt it to the underside of the chassis. Proceed similarly for the other chassis and its guide frame.

**PISTON ROD BEAM** should then be attached to the lower ends of the guide frames.

**VERTICAL GUIDES** are then added.

**THE FRONT AND REAR TRANSOMS** are bolted in place.

**BOTTOM PLATE.**—Place blocking in the counterweight well to within 18 inches of the base ring, being careful to leave the center of the bottom plate uncovered as well as the holes for the four suspension rods. The bottom plate should be laid on this blocking, the clips on it engaging the vertical guides. It should be carefully leveled to prevent distortion of the bronze gibs.

**RECOIL CYLINDER**, with the lower cylinder head, should be placed in the bottom plate and secured to it.

**COUNTERWEIGHT** is then piled and the suspension rods inserted and secured to the bottom plate.

**CROSSHEAD** is then added from above. If the upper end of the recoil cylinder is found not to be exactly in position with respect to its bore in the crosshead, the bottom plate should be tipped slightly as necessary by means of jacks applied to its underside.

**RETRACTING AND TRIPPING GEAR.**—The retracting gear is marked to indicate the teeth which are to be engaged in assembling, so that the whole will function properly when assembled. After the retracting and tripping gear is in place, it should be tested by raising and lowering the crosshead with it for a short distance. The clutches should not be tripped with the crosshead suspended and the latter allowed to drop on the counterweight. The fact should be verified that the clutches engage simultaneously when released. After the retracting and tripping gearing has been assembled satisfactorily, the crosshead may be attached to the counterweight by means of the suspension rods. No attempt should be made to lift the counterweight with the retracting gear before the gun is in place.

**PISTON ROD AND UPPER CYLINDER HEAD** are then placed.

**COUNTER-RECOIL BUFFERS AND ROLLER CAGES** should now be added, the latter being placed against the stops with the gears engaged.

**Top Carriage** should be lowered into its forward position from above so that the gears will engage properly.

**Gun Levers** are then added, the top carriage being run rearward for this purpose, and the lower ends secured to the crosshead by the gun-lever pins.

**The Gun with Elevating Band** attached is then put in place.

The remaining parts of the carriage may now be assembled as convenient, including the elevating arm, slide, etc., guide brackets, sight standard, piston-rod brackets, elevating and traversing gearing, sight platform, sights, electrical equipment, recoil and buffer valves.

After the gun and elevating arm are in place the gun may be retracted slightly, freeing the blocking under the counterweight, the blocking removed, and the carriage run slowly into battery by means of the retracting cranks. This will permit the attaching of those parts which require the gun to be in battery.

**Important Points.**—After the carriage has been completely assembled and the gun mounted, the recoil and buffer cylinders filled, and the valves set as indicated in the description of the carriage, the following points should be noted, namely:

1. Traverse the carriage to the extreme position in both directions to see that it moves freely and that traversing stops are properly located.
2. Elevate and depress the gun to the extreme limits to see that the parts operate freely and that the depression stop is properly located.
3. Retract the gun while in its extreme positions against the azimuth stops to determine whether there be any interference for recoil in such positions.
4. Examine and clean out all oil holes, noting that they have oil plugs.
5. See that there is not a hard bearing between the rimbases of the gun and gun levers.
6. See that the elevating arm and band are properly assembled, the clearance on each side being the same, and the arms not sprung or twisted.
7. See that the chassis rails and guide clips have not been burred.
8. See that the dust guard does not bear against the distance rings or racer.
9. Adjust the buffer valve until the gun rises as promptly as possible into battery without striking the stops with force.
10. See that the clutches engage simultaneously and that the retracting gearing, tripping gearing, and the safety latches function properly.
11. Set the elevation pointer by use the of a clinometer supported by a rest in the muzzle of the gun, dowel pin it in position, and verify the graduation.

12. Orient the gun, add numbers to the degree marks on the azimuth circle, adjust azimuth pointer to indicate correct azimuth, and dowel pin it in position. Muzzle at true south is 0 degrees in azimuth and the numbers are placed around clockwise to include 359.

13. Adjust the sight-arm brackets by means of the set screws, so that the telescope will be parallel to the bore of the gun, as described previously in connection with the sight.

14. Adjust the sight-arm parallel mechanism of the model of 1905, so that, with the gun and sight set to exactly the same reading in elevation, they are both on the same target.

15. See that the electrical connections have been properly made by trying the lights and firing the primer.

# CARE OF CARRIAGE.

General Instructions.—Carriages should be traversed from time to time throughout their entire allowed movement. They should not be allowed to stand for long periods at a particular azimuth, as this might cause uneven settling of the platform.

The habitual position of guns on disappearing carriages is "from battery," but at intervals the gun should be allowed to rise to the firing position and be elevated and depressed within the limits of the stops.

*It is required that all parts of carriages be kept free from rust at all times.* If this be allowed to accumulate, its removal from bearing parts, and especially piston rods, requires particular attention, in order that clearances may not be unduly increased. The use of sandpaper for this purpose is forbidden, and emery cloth No. 1 should be used, the rust being softened, if necessary, by kerosene.

The retracting wire ropes should at all times be kept well oiled with raw linseed oil.

If any leakage occurs from the hydraulic-recoil system, it should be immediately remedied, calling, if necessary, upon the district armament officer for the services of skilled labor.

The repacking of stuffing boxes may be done, when necessary, by trained enlisted men under the supervision of an officer, but will preferably be done by skilled labor.

Before removing a cylinder head containing a stuffing box, or drawing a piston rod through a stuffing box, the pressure of the packing on the rod should be released by unscrewing the follower or gland several turns.

The copper gaskets between cylinders and their heads should be in good condition, and consequently should be replaced whenever necessary in order to prevent leakage.

Cleaning Hydraulic Cylinders.—Recoil and buffer cylinders should be emptied and refilled at least every three months, and thoroughly cleaned every six months. For cleaning, a plumber's hand force pump is supplied to each Coast Artillery Post, with about 10 feet of suction hose and 15 feet of discharge tube.

The following operations are outlined for cleaning the recoil cylinder:

(*a*) Retract the gun sufficiently to afford room for working below the recoil cylinder; remove the oil from the cylinder, and the glands and followers.

(*b*) Remove the lower piston-rod nut and unscrew the upper one, lower the rod until the nut is disengaged, then allow the rod to rest on a block in the bottom of the pit so that its upper end will be disengaged from the piston-rod bracket; support the sighting platform at the rear end, remove the bolts from the piston-rod bracket and remove it to the right. Remove the upper cylinder head and then raise the piston rod, removing the upper piston-rod nut and rest it on a block above the piston-rod beam.

(*c*) Run the gun slowly into battery by means of the retracting cranks, raising the ratchet pawls, and give the gun its maximum elevation. Raise the piston rod vertically until its upper end strikes the gun, then incline it to one side and remove it from the cylinder.

(*d*) Thoroughly clean the cylinder from its upper end with kerosene oil forced in with the hand pump, then wipe dry with clean cotton waste. Clean also the cylinder heads, glands, and followers, and the piston rod inside and out, removing the recoil valve.

(*e*) After the removal or evaporation of all kerosene oil, reassemble the parts and refill the cylinder with hydrolene oil, carefully inspect all parts which were dismounted, and complete the retraction of the gun.

The following operations may be outlined for cleaning the buffer cylinders:

(*a*) Remove the glands, stuffing boxes, and pistons, and also the gland, valve stem, and emptying plug of the buffer valve.

(*b*) Clean the cylinders as described for the recoil cylinder. The equalizing and throttling pipes should also be thoroughly cleaned by forcing the oil into them with the pump, permitting it to run out through the emptying hole.

(*c*) After the removal or evaporation of all kerosene oil, reassemble the parts and refill the cylinders with hydrolene oil, after which, close the buffer valve to its normal setting.

REMOVING PACKING FROM STUFFING BOXES.—A packing extractor for removing packing from the stuffing boxes of the recoil cylinder is issued to each post at which these carriages are mounted. To use the extractor, the gun must be retracted sufficiently to afford access to the stuffing boxes. Close the extractor around the piston rod and insert the locking pin, turn the extractor counterclockwise, pressing it against the packing, until the needles are firmly engaged. Draw the packing out, turning slowly counterclockwise. Extractor bars are provided for use in starting the packing from its seat, by inserting the toes of the bars in the rack teeth and prying over the edge of the box, being careful not to injure it.

The packing of the buffer cylinders and of the buffer valve can generally be removed with any pointed instrument by merely removing the glands. In case of difficulty, the stuffing boxes of the former can be removed and the packing taken out with the finger, and in the latter the valve stem may be removed.

REPACKING STUFFING BOXES.—Examine the old packing and discard all unfit for use. If any of the old packing is used, it should be put in after the new.

To repack a stuffing box after the packing has been removed, insert one ring of packing and force it well to the bottom of the box by a wooden stick and mallet. Treat each layer of packing in a similar manner, being careful that successive rings break joints. Six rings of packing are required for each stuffing box of the recoil cylinder, five rings for each stuffing box of the buffer cylinders, and four rings for the buffer valve.

In screwing up the glands or followers *no other tools should be used than those provided for the purpose, nor should excessive force be applied to them, such as the addition of a pipe to the handle of the wrench.* Care should be exercised in tightening the recoil cylinder glands of the model of 1905 to advance all four of the bolts evenly so as not to throw the gland out of alignment. It will be found necessary to tighten the glands of the buffer cylinders but slightly. *Attention is invited to the caution given in regard to this under the description of the counter-recoil buffers.*

It is to be expected that a slight amount of oil will soak through and drip from boxes of carriages when not in use. Also when tightening the followers a slight amount of oil will squeeze out of the saturated packing. This oil should be caught and not allowed to render the carriage unsightly.

FILLING CYLINDERS.—To fill the recoil cylinder remove the filling plug and pour clean hydroline oil into it through a funnel until the oil overflows. *Allow any air that may be present to escape, then pour in more oil, until the cylinder is again filled.* About 7.5 gallons are required. The cylinder should be filled with the gun slightly out of the recoiled position.

To fill the buffer cylinders remove both filling plugs and pour clean hydroline oil through a funnel into one cylinder, allowing the air to escape from the other, until both cylinders are filled. *Allow any air that may be present to escape and pour in more oil until the system is again filled.* A full gallon of oil is required.

SERVICE CONDITION (LUBRICATION, ETC.).—When the carriage is to be kept in readiness for service, and is in daily or frequent use, all bearing parts must be kept thoroughly cleaned and lubricated.

Especial attention should be given to the lubricating of trunnion beds, rollers, pintle surfaces, shaft bearings, and sliding surfaces; gun lever axle beds, gun lever pins, elevating screw, elevating band trunnions, crosshead guides, and the elevating, traversing, tripping, and retracting mechanism, including the teeth of all gears.

*The above parts should be lubricated at frequent intervals, whether the carriage is maneuvered or not. When carriages are in use for daily drills a thorough lubrication twice each week should be sufficient for all but the most severely used parts.*

Proper lubricating and cleaning of the traversing rollers and their paths are essential to free working of the carriage. The dust guards should be removed to clean the upper roller path. By removing the cover plates on the racer the traversing rollers may be lifted out with their bearings for cleaning and for cleaning the lower roller path.

Four oil plugs are screwed into steel tubes in the upper surface of the racer, outside of the front and rear of each chassis, which are provided with passages to the pintle surface. Eight oil plugs, two at each of the above points, are also provided, connected to brass tubes reaching down to the oil grooves of the distance ring, thus providing lubrication for the bearings of the rollers. Six additional of such oil pipes are also provided, two each at the front, right, and left of the racer for exceptional use in lubricating the roller bearings. They are closed by countersunk screws. *For oiling the rollers or pintle through these holes the carriage must be traversed in order to distribute the oil through the entire circumference.*

It will occasionally be necessary to examine all ball and roller bearings to see that the dust guards are in proper place and that the rollers themselves are clean. If they be found dirty, they may be flushed with kerosene oil; but care must be taken to fill the bearings with synovial oil after the kerosene has drained away. If the rollers have rusted, they must be removed and cleaned.

CONDITION "IN ORDINARY" (NOT READY FOR IMMEDIATE SERVICE).—If the carriage is to remain unused for a time, all unpainted surfaces should be covered with a *thin* coat of light slushing oil. It can be applied as in painting, using sash tool No. 6, except in cold weather, when it should be applied by stippling, i. e., light tapping, with the brush held perpendicular to the surface to be covered.

*In all cases it should be applied as in a thin coat, as this is all that is needed to give good protection.*

This oil is easily removed by the use of burlap or waste dipped in kerosene oil. In order to save oil the thickest of the slushing oil should be well removed by a scraper before applying the kerosene.

Before applying the slushing oil the surfaces should be thoroughly cleaned, so as to be entirely free from rust, water, kerosene, or lubricating oil, as the first three would cause rusting underneath, and the latter would cause it to run off when heated.

Rollers and roller paths should be cleaned and slushed from time to time and the dust guards examined to see that the felt strips are in order and make the openings dust tight.

Experience has shown that hydraulic cylinders should not remain empty, as in that case the interior walls soon become rusty.

OIL HOLES.—Oil holes should be cleaned out frequently to keep them free from sand and grit, and should habitually be kept closed by the screw plugs provided, except when in the act of oiling.

*Before removing the plug from any oil hole carefully wipe off any dirt or grit near the opening that might be carried into the bearing with the oil.*

COMPRESSION GREASE CUPS.—Where compression grease cups are provided similar precautions against dirt or grit must be observed. When adding grease to these cups do not fill them completely, but fill only to the bevel at the top of the cup; if too full, the leather packing will become inverted and will not act effectively. In putting on the cap see that the leather packing enters the cup without being caught or bent by the edge of the cup.

Screw the cap down on the cup until the spring rod projects about 0.25 inch above the top of the cap. The cap should be screwed down from day to day as required to maintain about this projection for the rod. When the cap is screwed nearly home the cup should be refilled.

OILS AND GREASE.—The Vacuum Oil Company's No. 4½ lubricant is issued for use in the compression grease cups; it will not be used for lubricating any other parts, nor will any other oil be used in its place.

Light slushing oil is provided for covering unpainted surfaces on the gun and carriage, as well as the bore of the gun, when they are not in current use.

Synovial oil should be used to lubricate the bearings where oil holes and oil plugs are provided. It will also be used as a lubricant for breechblock threads. No other lubricant will be used on such threads during firings.

Kerosene oil is issued by the Ordnance Department for cleaning purposes only.

A special grade of neutral oil called "hydroline" having a specific gravity of about 0.85, is furnished for filling the recoil cylinders. A barrel of this oil should be kept on hand to replace leakage.

The different kinds of oil, etc., will be kept in receptacles plainly marked with their contents. The enlisted men should be carefully instructed in the use of the several kinds of oil, grease, etc., and should be taught to distinguish one from another.

Oils must always be kept in closed receptacles to prevent contamination by water, dirt, etc.

Oils which have been used for any purpose should not be used again without being filtered or carefully strained. They should never be returned to receptacles containing new oil.

A suitable receptacle should be kept by each battery in which oil from cylinders can be placed and allowed to stand undisturbed until all sediment in it has settled. In removing the oil great care should be taken that no sediment is included.

Mere discoloration does not affect the serviceability of the oil.

Painting.—In general, three coats of paint will be given carriages the first year; two coats annually thereafter will probably suffice, the actual needs depending somewhat upon the climate and local conditions. Before painting, surfaces should be rubbed smooth and made perfectly clean and dry. As soon as the carriage is completely assembled and the piece mounted all parts which have been marred in transportation will be primed, after which one complete coat of olive-drab paint will be applied.

All steel and iron nonbearing surfaces, both covered and exposed, will be painted. This includes the exposed parts of shafts (except squared ends), the exterior of the recoil cylinder, and springs. Large bronze pieces, including the web and spokes of wheels and cylinder heads, should also be painted.

The following parts are not painted: All wearing or bearing surfaces, including the handles of handwheels and cranks, teeth of all gears, the retracting clutches, the rollers and the surfaces on which they travel, the piston rods and the vertical guides, etc.

*List of implements furnished for 6-inch gun, model of 1905.*

1 rammer head and staff.
1 sponge head and staff in three sections; head to be made to fit bore or chamber by wrapping with burlap.
1 breech cover.
1 combined tompion and muzzle cover.
1 sponge cover, bore.
1 slush brush, with handle, to connect sponge staff.
1 steel scraper and socket to fit sponge staff.

For allowances of cleaning and preserving material, see Form No. 1869.

*Spare parts for each 6-inch disappearing carriage, limited fire, model of 1905.*

Garlock's waterproof hydraulic packing:
    4 rings, 0.375 inch square and 6.75 inches long each, for buffer cylinder heads.
    1 ring, 0.25 inch square and 4 inches long each, for buffer valve.
    6 rings, 0.5 inch square and 11.062 inches long each, for recoil cylinder heads.
Copper gaskets:
    4 for buffer cylinder heads.
    2 for recoil cylinder heads.
    2 for filling and drain plugs of recoil cylinder.

Fiber gaskets:
  1 dozen for equalizing or throttling pipe connections.
  1 dozen for drain plugs of gear covers, etc.
2 filling and drain plugs (36A) for recoil cylinder.
4 cylinder plugs (H7R) to replace equalizing and throttling pipes, continuing the carriage in action after their injury.
12 dust guard bolts (H4M) for felt strips.
6 dust guard bolts (H4N), outer dust guard to base ring.
12 bolts (H4K), bearings to distance rings.
4 dozen oil plugs (Q3C).
6 drain plugs (19C).
1 spare slit pin for each one on the carriage, not to exceed, however, 1 dozen of any size.
1 spare taper pin for each one on the carriage, not to exceed, however, 6 of any size.
1 safety latch pawl spring (32S).
1 retracting clutch spring (21J).
1 safety latch spring (21AG).
1 pawl spring (A14J).[a]
1 firing leaf cord complete (A14W).[a]
1 reel cord complete (A14R).[a]
4 16-candlepower 110-volt lamps.
4 8-candlepower M lamps, 110 volts.
6 2-candlepower (5X) lamps, 110 volts.
2 N receptacles for 8-candlepower lamps.
3 (5U) receptacles for 2-candlepower lamps.

*List of articles packed in the armament chest for 6-inch R. F. guns, model of 1905, on 6-inch disappearing carriages, model of 1905.*

[NOTE.—All articles marked * are carried loose in chest.]

For guns, model of 1905:
  3 brushes, cleaning, for primer seat.
  1 cloth, emery, No. 00, 1 quire.
  1 drift, bronze, large.
  1 drift, bronze, small.
  1 drill, gunner's.
  3 files, pillar No. 6, 6 inches.[b]
  3 files, 3-cornered, No. 4, 6 inches.[b]
  3 files, half round, smooth, 8 inches.[b]
  3 files, round, smooth, 8 inches.[b]
  1 file, flat, dead smooth, 8 inches.[b]
  1 file, round, second cut, 8 inches.[b]
  1 file, half round, smooth.
  1 file, three cornered.
  1 hammer, boiler maker's.
  1 hammer, copper.
  *1 lanyard, gunner's.
  1 mallet, hand.
  1 mallet, long handle.
  1 pliers, cutting, 7-inch.
  *1 pouch, gunner's.
  1 punch, gunner's.

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[a] For lanyard attachment.

[b] For use on bruised breechblocks. No other files to be used thereon.

For guns, model of 1905—Continued.

- 1 punch, pin.
- 1 reamer, cleaning, for primer seat.
- 1 scraper, metal.
- *1 sleeves, gunner's, 1 pair.
- *3 sponges, wagon.
- *4 balls twine, assorted.
- *10 pounds cotton waste.
- *2 pounds wire, copper, No. 12.
- *2 pounds wire, copper, No. 16.
- 1 wrench, monkey, 12-inch.
- 1 wrench, monkey, 15-inch.
- 1 wrench, tit, for obturator.

Implements for carriage:

- 1 extractor, gun lever pins.
- 2 hooks, counterweight.
- 1 hook, traversing roller.
- 2 oilers, half pint.
- *1 oiler, locomotive, 1 quart.
- 2 pinch bars.
- 1 screw driver, commercial, 3-inch blade.
- 1 screw driver, commercial, 5-inch blade.
- *1 screw driver and socket wrench.
- 1 wrench, double, 0.375 and 5 inch nuts.
- 1 wrench, double, 0.625 and 0.75 inch nuts.
- 1 wrench, double, 1 and 1.25 inch nuts.
- 1 wrench, double, 1.5 and 1.75 inch nuts.
- 1 wrench, double, 2.5 and 2.75 inch nuts.
- 1 wrench, single, 3-inch nuts.
- 1 wrench, single, 0.75-inch nuts.
- 1 wrench, throttling valve.
- *1 wrench, buffer gland.
- *1 wrench, single, piston rod.

## *Names of parts of 6-inch disappearing carriage, L. F., model of 1905, their piece marks, location, and material of which they are made.*

The parts are listed alphabetically under the following headings: Carriage proper; electrical parts, including the firing circuits. For parts of the telescopic sight, sight cradle, sight arm, illuminating circuits of the sight, and sight cover, see Form 1955.

*When referring to a part, always mention its piece mark, where given on the list.*

### MEANING OF ABBREVIATIONS IN COLUMN OF MATERIAL.

| | |
|---|---|
| A | Ash |
| Br. | Brass. |
| Bz | Bronze. |
| T. Bz. | Tobin Bronze. |
| C | Copper. |
| C. I. | Cast Iron. |
| C. S. | Cast Steel. |
| F. | Felt. |
| F. S. | Forged Steel. |
| G. I. | Galvanized Iron. |
| G. S. | German Silver. |
| H. R. | Hard Rubber. |
| M. I. | Malleable Iron. |
| M. M. | Molded Mica. |
| S. | Steel. |
| Sp. S. | Spring Steel. |
| V. F. | Vulcanized Fiber. |
| V. R. | Vulcanized Rubber. |
| W. I. | Wrought Iron. |
| S. R. | Soft Rubber. |

### CARRIAGE PROPER.

| Piece mark. | Number. | Name of part. | Location. | Material. | Remarks. |
|---|---|---|---|---|---|
| (32AB) | 1 | Angle | Front end of sighting platform | S. | 3 by 2.5 by 0.25 inch angle. |
| (33F1) | 1 | do. | Right side of sighting platform | S. | 1.75 by 1.75 by 0.187 inch angle. |
| | 1 | Angle, rear end | Sighting platform | S. | Same material as front and angle. |
| | 1 | Angle stiffener | do. | S. | Attached to platform brackets. Material same as front end angle. |
| (H6L) and (H6M) | 2 | Axle caps | Top carriage | C. S. 2. | For axle arm bearings, 1 right, 1 left. |
| (H13S) | 1 | Axle, lower guide sheave | Rear clip and traversing bracket | F. S. | 13.25 inches long. For counter-balance device. |
| (H13T) | 1 | Axle, upper guide sheave | Rear transom | F. S. | 14.5 inches long. For counter-balance device. |
| (23J) | 1 | Ball thrust bearing | Traversing gear | S. | For traversing intermediate shaft. |
| (23K) | 1 | do. | do. | S. | For traversing pinion shaft. |
| (12C) | 2 | Band trunnions | Elevating band | F. S. 2. | |
| (15H) | 1 | Base | Elevation and range scale pointer | C. I. 2. | 50.75 inches long. |
| (H3D) | 1 | Base ring | On concrete platform | C. I. 2. | |
| (21R1) | 2 | Battery box brackets | Underneath sighting platform | | |

*Names of parts of 6-inch disappearing carriage, L. F., model of 1905, their piece marks, location, and material of which they are made*—Continued.

CARRIAGE PROPER—Continued.

| Piece mark. | Number. | Name of part. | Location. | Material. | Remarks. |
|---|---|---|---|---|---|
| (H4C) | 48 | Bearings | Distance ring | Bz. 3. | For traversing rollers. |
| (27W) and (27X) | 16 | Clip bolts and nuts | Crosshead | F. S. 2. | 10 long and 6 short, for securing guide clips. |
| (27A) | 2 | Bottom plate liners | Bottom plate | Bz. 4. | 8 by 7.5 by 0.325 inch. |
| (27G) | 1 | Bottom plate | Counterweight well | C. S. 1. | |
| (27P) | 4 | Bottom plate gibs | Clips of bottom plate | Bz. 4. | 7.5 inches long. |
| (10Z) | 1 | Bracket, hasp | Recoil valve | Bz | Attached to piston-rod bracket. |
| (20D1) | 1 | Bracket, sight arm | Top of sight standard | C. S. 1. | |
| | 1 | Brace, corner, 120 degree angle | Sighting platform | S. | For left rear corner. |
| (25E1) | 2 | Braces (lower) | Lower end of sight standard | S. | For attaching telephone. |
| (25F1) | 2 | Braces (upper) | ....do | S. | Do. |
| | 3 | Corner braces | Sighting platform | S. | At corners of platform angles. |
| (6F) | 1 | Bushing | Right chassis | Bz. | For tripping lever shaft. |
| (7H) | 1 | ....do | Left chassis | Bz. | For safety latch shaft. |
| (7F) | 1 | ....do | ....do | Bz. | For tripping lever shaft. |
| (7G) | 1 | ....do | ....do | Bz. | For retracting pawl shaft. |
| (8J) | 1 | ....do | Rear transom | Bz. No. 2. | For elevating screw. |
| (8D) | 1 | ....do | Elevating screw support | Bz. | For elevating screw, lower end. |
| (6J) | 1 | ....do | Right chassis | Bz. | For safety latch shaft. |
| (10W1) | 1 | ....do | Lower cylinder head | Bz. No. 4. | At upper end of stuffing box. |
| (10D1) | 1 | ....do | Upper cylinder head | Bz. No. 4. | At lower end of stuffing box. |
| (12L) | 2 | Bushings | Elevating arm | Bz. | For band trunnions. |
| (14B1) | 1 | Bushing | Left rear of carriage | Bz. | In elevating connecting shaft bearing (lower). |
| (17R) | 1 | ....do | On traversing crank shaft | Bz. No. 2. | In traversing clutch gear. |
| (18E) | 1 | ....do | Sight standard | Bz. | In traversing intermediate shaft bearing (upper) for traversing handwheel shaft. |
| (22K) | 1 | ....do | ....do | Bz. | In traversing handwheel shaft bearing. |
| (29D) | 2 | Bushings | Retracting gear | Bz. No. 4. | For retracting clutch pinions |
| (29U) | 2 | ....do | ....do | Bz. | For inside retracting pawl (29S). |
| (30H) | 2 | ....do | ....do | Bz. | Retracting clutch cover. In halves, 8.75 inches in diameter. |
| (30J) | 2 | ....do | ....do | Bz. | Retracting clutch cover. In halves, 8 inches in diameter |
| (H6B) | 36 | ....do | In flanged recoil rollers | Bz. | |
| (H6C) | 36 | ....do | In unflanged recoil rollers | Bz. | |
| (H6S and H6T) | 2 | Bushings, axle bed | Top carriage | Bz. No. 3. | |
| (H9E) | 2 | Bushings | Gun levers | Bz. No. 3. | 8 inches diameter, for gun lever pins. |
| (H9G) | 2 | ....do | ....do | Bz. No. 3. | In halves, for gun trunnion, 7 inches diameter. |
| (H12E) | 2 | ....do | Elevating slide | Bz. | For elevating pin. |
| (H13G) | 2 | ....do | Upper guide sheaves | Bz. | |
| (H13H) | 2 | ....do | Lower guide sheaves | Bz. | |
| (H9C and H9D) | 2 | Cap squares | Gun levers | C. S. No. 2. | For gun trunnions. |

| | | | | | |
|---|---|---|---|---|---|
| (7A1) | 1 | Chassis, left | Bolted to racer | C. I. No. 2. | |
| (6A1) | 1 | Chassis, right | do | C. I. No. 2. | |
| (H4E) | 4 | Clamps | Outer dust guard | S. | Uniting sections. |
| | 2 | Clevises | Rope of counterbalance device | F. S. | |
| (8E1) | 2 | Clips, front | Front of racer to the inside of front transom. | C. S. No. 2. | Engage over flange on base ring. |
| (18S) | 2 | Clutch rod ends | Traversing clutch | F. S. | Riveted to clutch rod. |
| (18T) | 3 | Clutch rod pins | Traversing clutch mechanism | Bz. | For connecting clutch rod to other parts. |
| (18W) | 1 | Clutch rod spring | Sighting platform | S. S. | Surrounds traversing clutch plunger. |
| | 1 | Collar | Drain plug | Br. | Brazed to spout. |
| (13B) | 4 | Collars | Elevating shaft | Bz. | Close ends of bearings. |
| (H13L) | 2 | do | Lower guide sheave axle | S. | |
| (14BA) | 2 | do | Elevating connecting shaft | Bz. | For closing ends of bearings. |
| (14D) | 1 | Collar | Elevating connecting shaft pinion | Bz. | |
| (14E) | 1 | do | Elevating connecting shaft gear | Bz. | |
| (16D) | 1 | do | Traversing handwheel shaft | Bz. | |
| (16H) | 1 | do | Traversing intermediate shaft, lower end | Bz. | |
| (16G) | 1 | do | Traversing intermediate shaft, upper end | Bz. | |
| (16K) | 6 | Collars | Traversing crank shaft | Bz. | To close ends of bearings. |
| (16BA) | 1 | Collar | Traversing crank shaft, left end | F. S. No. 3. | To prevent longitudinal movement of traversing clutch gear. |
| (29W) | 2 | Collars | Retracting crank shaft | Bz. | To close ends of bearings in chassis. |
| (29K) | 2 | do | do | Bz. | In rear of middle bearing. |
| (32C) | 2 | do | Tripping lever shaft | Bz. | To close ends of bearings. |
| (32F) | 2 | do | Safety latch shaft | Bz. | Do. |
| (27F) | 6 | Layers of counterweight, first to sixth, inclusive. | In counterweight well | C. I. | |
| (27D) | 2 | Pieces of counterweight, side, seventh layer. | Counterweight | C. I. | |
| (27E) | 1 | Piece of counterweight, inside, seventh layer. | do | C. I. | |
| (27C) | 2 | Pieces of counterweight, eighth layer | do | C. I. | |
| (15L) | 1 | Cover | Elevation and range scale and pointer | C. I. No. 2. | Bolted to base. |
| (7D) | 3 | Crank hooks | On chassis | F. S. | To hang cranks. |
| (21F) | 2 | Crosses | Sighting platform | M. I. | For railing. |
| (27B) | 1 | Crosshead | Above counterweight | C. S. No. 1. | |
| (27L and 27M) | 2 | Crosshead gibs | Guide clips | Bz. No. 4. | 0.725 inch thick with oil hole and groove, 1 right, 1 left. |
| (27N) | 2 | do | do | Bz. No. 4. | 0.485 inch thick without oil hole and groove on front surface of guide clip. |
| (27S and 27T) | 2 | Crosshead liners | do | Bz. No. 4. | 1 right, 1 left, 67 by 8.25 by 0.235 inch. |
| (10X1) | 1 | Cylinder head, lower | Recoil cylinder | F. S. No. 3. | Attached to bottom plate. |
| (10C1) | 1 | Cylinder head, upper | do | F. S. No. 3. | |
| (23Q1 and 23R1) | 2 | Direction plates, retracting | At retracting cranks | Bz. | 1 right, 1 left. |
| (23T) | 1 | Direction plate, traversing | At traversing crank | Bz. | |
| (23U) | 2 | Direction plates, depress | On elevating handwheel (13J) | Bz. | |
| (23V) | 2 | Direction plates, elevate | do | Bz. | |
| (H4A) | 1 | Distance ring | Between racer and base ring | C. S. No. 2. | Holds traversing rollers in alignment. |
| (15M) | 1 | Dog | Bolted to left side of elevating slide (H12C). | C. S. No. 1. | A part of elevation and range scale and pointer. |
| (H4D) | 1 | Dust guard, outer | Bolted to base ring | S. | In four sections. |
| (H4J) | 1 | Dust-guard strip, inner | do | S. | Do. |
| (21D) | 5 | Elbows | Railing of sighting platform | M. I. | |

*Names of parts of 6-inch disappearing carriage, L. F., model of 1905, their piece marks, location, and material of which they are made*—Continued.

CARRIAGE PROPER—Continued.

| Piece mark. | Number. | Name of port. | Location. | Material. | Remarks. |
|---|---|---|---|---|---|
| (12A) | 1 | Elevating arm | From rear transom to breech of gun | C. S. No. 2. | 105 inches long. |
| (12B) | 1 | Elevating band | Around breech of gun | C. S. No. 1. | In two halves, hinged at top and bolted at bottom. |
| (14S) | 1 | Elevating clutch | On elevating shaft inside of left chassis | F. S. No. 2. | To permit use of slow-motion elevating gearing. |
| (14FA) | 1 | Elevating clutch fork | Inside of rear of left chassis | F. S. No. 1. | To shift elevating clutch. |
| (14Q) | 1 | Elevating clutch fork pivot | Screwed into elevating connecting shaft bearing (upper). | F. S. No. 1. | |
| (14C) | 1 | Elevating clutch shifter rod | At rear end of left chassis | F. S. No. 1. | Supported in 14J. |
| | 1 | Elevating clutch shifter rod bearing | do | Bz. No. 2. | |
| (14B) | 1 | Elevating clutch shifter | At right end of elevating clutch shifter rod 14C. | F. S. No. 1. | |
| (14K) | 1 | Elevating clutch shifter rod handle | At left end of 14C | Bz. No. 2. | |
| (14CA) | 1 | Elevating connecting shaft | Inside of rear of left chassis | F. S. No. 1. | 23.348 inches long, 1.5 inches in diameter. |
| (14W1) | 1 | Elevating connecting shaft bearing (lower). | Rear end of left chassis | C. I. No. 1. | Has bearings for shaft 14EA1 and for shaft 14CA. |
| (14X) | 1 | Elevating connecting shaft bearing (upper). | Bolted to inside of rear of left chassis | C. I. No. 1. | Has bearing for upper end of shaft 14CA and for pivot 14Q. |
| (14L) | 1 | Elevating connecting shaft gear | On elevating shaft inside of left chassis | F. S. No. 2. | 42 teeth; 3 clutch teeth on right end engaging elevating clutch. |
| (14Z) | 1 | Elevating connecting shaft-gear cover | Surrounds gears 14L and 14M | C. I. | In halves. |
| (14M) | 1 | Elevating connecting shaft pinion | Keyed to upper end of connecting shaft 14CA. | Bz. No. 1. | 24 teeth. Engages gear 14L. |
| (17Y) | 1 | Elevating gear cover | Around gears 17E and 17F | C. I. | In halves. |
| (8F and 8G) | 2 | Elevating gibs | Bolted to rear transom | C. S. No. 1. | 1 right, 1 left. Hold elevating slide in place. |
| (13J) | 1 | Elevating handwheel | Left end of elevating shaft | C. I. and S. | Composed for C. I. hub with steel rim and spokes. |
| (13E) | 1 | Elevating handwheel, slow motion | Sighting platform | Bz. No. 1. | |
| (14EA1) | 1 | Elevating handwheel shaft, slow motion. | do | F. S. No. 1. | |
| (14F) | 1 | Elevating handwheel shaft gear, slow motion. | Upper end of elevating connecting shaft | Bz. No. 1. | 56 teeth. |
| (14Y) | 1 | Elevating handwheel shaft-gear cover, slow motion. | Surrounds gear 14F and pinion 14G | C. I. | In halves. |
| (14G) | 1 | Elevating handwheel shaft pinion, slow motion. | Forward end of slow-motion elevating handwheel shaft. | F. S. No. 2. | 16 teeth. |
| (12H) | 1 | Elevating pin | Lower end of elevating arm | F. S. No. 3. | Secured to elevating arm by set screw 12D. |
| (15E) | 1 | Elevation scale | Riveted to slide 15A | G. S. | Graduated to least reading of 3 minutes. |
| (13A) | 1 | Elevating shaft | Rear of carriage | F. S. No. 1. | Rests in bearings in left chassis and rear transom. |
| (17E) | 1 | Elevating shaft gear | At upper end of elevating screw | C. I. No. 1. | 27 teeth. |
| (17F) | 1 | Elevating shaft pinion | do | F. S. No. 2. | Keyed to elevating shaft, 20 teeth. |
| (H12D) | 1 | Elevating slide | In guide ways of rear transom | C. S. No. 2. | Supports lower end of elevating arm. |

| | | | | | |
|---|---|---|---|---|---|
| (H12H) | 1 | Elevating slide nut | Under elevating slide and surrounding elevating screw. | Bz. No. 4. | 10 inches long, threaded singly, 0.675-inch pitch. |
| (H12N) | 1 | Elevating slide stop | At upper end of right guideway of rear transom. | F. S. | To limit depression of gun to 0 or 2 degrees 30 minutes, depending upon its position. |
| (H12A) | 1 | Elevating screw | At rear transom | F. S. No. 3. | 54.5 inches long, 2.25 inches in diameter; threaded 39 inches. |
| (8C) | 1 | Elevating screw support | Lower end of elevating screw | C. S. No. 1. | Bolted to rear transom. |
| (H139) | 1 | Equalizing bar | Above counterbalance weight | F. S. | Weight attached to middle and rope attached to extremities. |
| | 2 | Fillers | Above safety latches in crosshead | S. | Limit the rotation of safety-latch pawls outward. |
| | 1 | Filler plate | Underneath sighting platform | S. | |
| (10EA) | 2 | Followers | Upper and lower stuffing boxes of recoil cylinder. | Bz. No. 4. | Turned by spanner wrench. |
| (H13D) | 1 | Fork, equalizing bar | In counterbalance weight | F. S. | Serves to connect weight to equalizing bar (H13N). |
| (9A1 and 9B1) | 2 | Frames, guide | Bolted to underside of chassis opposite counterweight. | C. I. No. 2. | 1 right, 1 left; 78 inches long. |
| | 2 | Gaskets | Upper and lower cylinder heads | C. | 7.75 inches outside diameter, 7.25 inches inside diameter, 0.062 inch thick. |
| (H6A) | 36 | Gears | On ends of flanged recoil rollers | F. S. No. 3. | To prevent skidding of top carriage. |
| (10J1) | 2 | Glands | Upper and lower cylinder heads of recoil cylinder. | F. S. No. 3. | Sawed in halves; engaging over followers (10EA). |
| (27J and 27K) | 2 | Guide clips | Bolted to crosshead | F. S. No. 1. | 1 right, 1 left; engaging vertical guides; contain rack for retraction. |
| (13C) | 1 | Guide bracket, right | Bolted to right chassis and to upper end of right vertical guide. | C. S. No. 1. | |
| (9C and 9D) | 2 | Guides, vertical | Bolted to inside of chassis in guide frames | F. S. No. 2. | 1 right, 1 left. |
| (H9A and H9B) | 2 | Gun levers | Support gun and rest in top carriage | C. S. No. 1. | Do. |
| (H9H) | 1 | Gun-lever axle | Rests in bearings in top carriage | F. S. No. 3. | |
| (27Y) | 2 | Gun-lever pins | Secure crosshead to lower ends of gun levers. | F. S. No. 2. | |
| (H9J) | 1 | Gun-lever yoke | Bolted to upper ends of gun levers | C. S. No. 1. | |
| (10NA) | 1 | Gutter, oil | Bolted to piston-rod beam | Br. | Under drain plug (10JA1). |
| (10AA) | 1 | Hasp | At recoil valve | S. | Secures locking disk (10K1). |
| (7C) | 3 | Hooks, crank handle | On chassis | F. S. | For hanging cranks. |
| (15J and 15K) | 2 | Index plates | Cover of elevation and range scales | G. S. | Marked O. |
| (23W and 23AA) | 3 | Instruction plates, filling plug | One on crosshead; one on each buffer cylinder. | Bz. | 1 flat, 2 curved. |
| | 4 | Keys | Chassis to racer | S. | 1 by 1.5 by 8 inches. |
| | 2 | ....do | Elevating shaft (13A) | S. | Riveted in place; for elevating clutch (14S); 0.375 inch square. |
| | 2 | ....do | ....do | S. | For elevating handwheel (13J) and for elevating pinion (17F); 0.375 inch square. |
| | 1 | Key | Slow motion elevating handwheel shaft (14EA1). | S. | For pinion (14G); 0.25 inch square. |
| | 2 | Keys | Elevating connecting shaft (14CA) | S. | For gears; 0.312 inch square. |
| | 2 | ....do | Traversing crank shaft (16J2) | S. | For traversing clutch (16AA1); 0.437 inch square. |
| | 1 | Key, gib | ....do | S. | For pinion (17B); 0.437 inch square. |
| | 2 | Keys | Traversing intermediate shaft (16E1) | S. | 0.312 inch square; one long, one short. |
| | 1 | Key | Traversing handwheel shaft (16A1) | S. | 0.25 inch square; for pinion (17G1). |

[illegible]

[illegible] prior initial compression.

For securing the stop.

On lower end of equalizing bar fork

| | | | | | |
|---|---|---|---|---|---|
| (16B) | | do | Traversing handwheel shaft, rear end (16A1), and traversing intermediate shaft (16E1). | S. | |
| (16F) | 1 | Nut | Traversing handwheel shaft (16A1) and traversing intermediate shaft (16E1), upper end. | S. | |
| (16M) | 2 | Nuts | Traversing pinion shaft (16L) | S. | |
| (16C) | 1 | Nut | Traversing handwheel shaft (16A1), forward end. | S. | |
| (20F) | 2 | Nuts | Sight arm bracket pins (20E) | S. | |
| | 2 | do | Third round of sighting platform ladder (21M). | S. | |
| (27U) | 8 | do | Suspension rods | S. | |
| | 1 | Padlock, Yale standard, No. 853 | Recoil valve | | To prevent unauthorized changes of setting. |
| (32U) | 2 | Pawl fulcrums | Crosshead | F. S. | For safety latch pawls of tripping gear. |
| | 52 | Pins | Rack-retaining screws (6D) | S. | |
| | 32 | do | Rack-retaining screws (H6E) | | |
| | 2 | do | For bushing (6J) | Bz. | |
| | 2 | do | Bushing (6F) | Bz. | |
| | 2 | do | Bushing (7H) | Bz. | |
| | 2 | do | Bushing (7G) | Bz. | |
| | 2 | do | Bushing (7F) | Bz. | |
| | 1 | Pin | Bushing (8D) | Bz. | |
| | 2 | Pins | Bushing (8J) | Bz. | |
| | 2 | do | Recoil valve | Bz. | For fastening body to stem. |
| | 4 | do | Piston liner recoil system | Bz. | |
| (12K) | 1 | Pin | Hinge of elevating band | S. | |
| | 8 | Pins | Bushings (12L) | Bz. | |
| | 1 | Pin | Bushing (14V1) | Bz. | |
| | 1 | do | Shifter rod (14C) | S. | |
| | 4 | Pins | Collar (14E) | Bz. | |
| | 1 | P.in | Pointer lid hinge (15R) | S. | For hinge pivot. |
| | 2 | Pins | Bushing (17R) | Bz. | |
| | 1 | Pin | Bushing (18E) | Bz. | |
| | 7 | Pins, 0.25 rivet | Railing post feet | S. | |
| | 2 | Pins | Bushings (22K) | Bz. | |
| | 32 | do | Clip bolts and nuts (27W and 27X) | S. | |
| (29H) | 12 | do | Retracting clutches | S. | Serve as plungers of retracting clutch springs (29A). |
| | 8 | do | Bushings (29D) | Bz. | |
| | 4 | do | Bushing (29U) | Bz. | |
| | 24 | do | Bushings (30H and 30J) | Bz. | |
| (30L) | 4 | do | Retracting clutch covers | S. | |
| | 2 | do | Rope clamps (H12F and H12G) | S. | In elevating slide nut. |
| | 2 | do | Crosshead | S. | For filler of safety latch pawls (32T). |
| | 72 | do | Bushings (H6C) | S. | |
| | 72 | do | Gears (H6A) | S. | |
| | 8 | do | Bushings (H12E) | Bz. | |
| | 1 | Pin | Stop (H12N) | S. | |
| (H13Q) | 2 | Pins, rope socket | Counterbalance device | F. S. | |
| | 20 | Pins | Rope of counterbalance device (H13R) | S. | For securing ends of rope to clevises. |
| | 4 | do | Bushings (H13G) | Bz. | |

## 6-inch disappearing carriage, L. F., model of 190[illegible], their parts, location and material of which they are made—Continued

### CARRIAGE PROPER—Continued

| [illegible] | Number. | Name of part. | Location. | [illegible] | Remarks. |
|---|---|---|---|---|---|
| [illegible] | 1 | Pin, equalizing bar | [illegible] | [illegible] | |
| | 1 | Pinch-bar supports | [illegible] | [illegible] | |
| | 1 | Pinch-bar hooks | [illegible] platform | [illegible] | |
| ([illegible]) | 1 | Piston and rod | [illegible] | [illegible] | [illegible] |
| ([illegible]) | 1 | Piston liner | [illegible] | [illegible] | |
| [illegible] | 1 | Piston-rod bracket | [illegible] | [illegible] | [illegible] |
| 9M | 1 | Piston-rod beam | [illegible] | [illegible] | [illegible] |
| 19L | 1 | Pipe, oil | [illegible] | [illegible] | |
| | 1 | Plate | [illegible] | | [illegible] |
| | 10 | Plates | [illegible] | [illegible] | [illegible] |
| [illegible]H | 4 | Plates, fish | [illegible] | | [illegible] |
| 20K | 2 | Plates, racer cover | [illegible] | [illegible] | [illegible] |
| 20R | 1 | Plate, racer, left | [illegible] | | [illegible] |
| [illegible] | 1 | Plate, racer, right | [illegible] | [illegible] | |
| [illegible] | 1 | Platform bracket | [illegible] | [illegible] | [illegible] |
| 30B | 2 | Plugs | [illegible] | [illegible] | [illegible] |
| (10[illegible]) | 1 | Plug, drain | [illegible] | [illegible] | |
| ([illegible]) | 1 | Pointer lid | [illegible] | [illegible] | |
| ([illegible]) | 1 | Pointer-lid hinge | do | [illegible] | |
| ([illegible]) | 1 | Racer | [illegible] | [illegible] | |
| ([illegible]) | 1 | Racer liner | [illegible] | [illegible] | [illegible] |
| (H6G and H6H) | 4 | Racks | [illegible] | [illegible] | [illegible] |
| (6B and 6C) | 4 | do | [illegible] | [illegible] | [illegible] |
| (H6E) | 32 | Rack-retaining screws | [illegible] | [illegible] | [illegible] |
| (6D) | 52 | do | [illegible] | [illegible] | [illegible] |
| | 7 | Railings | Sighting platform | [illegible] | [illegible] |
| | 7 | Railing posts | do | [illegible] | [illegible] |
| | 3 | Railing-post extensions | do | [illegible] | [illegible] |
| (21T) | 7 | Railing-post foot | do | [illegible] | |
| (15D) | 1 | Range scale | Riveted to slide (10A) | [illegible] | |
| (10A1) | 1 | Recoil cylinder | In counterweight | [illegible] No. 3 | [illegible] |
| (19Q and 19R) | 2 | Recoil indicator scales | Bolted to inside of both chassis opposite opening at forward end. | Bz. | 1 right, 1 left. [illegible] from 32 to 52, inclusive. |

| | | | | | |
|---|---|---|---|---|---|
| (19H) | 2 | Recoil indicator pointers | Attached to front face of guide clips (27J) and (27K). | Bz. | |
| (10P) | 1 | Recoil valve body | Inside of piston rod at piston | Bz. No. 4. | 8 inches long, 1.5 inches in diameter, with slot 0.4 inch wide by 1.625 inches long. |
| (10N) | 1 | Recoil valve stem | Inside of upper half of piston rod | S. | 63.75 inches long. |
| (29L) | 2 | Retracting bevel gears | At rear ends of retracting clutch shafts (29J). | C. S. No. 3. | 64 teeth. |
| (29M) | 2 | Retracting bevel pinions | At extremities of retracting intermediate shaft (29V). | F. S. No. C. | 13 teeth. |
| (29E and 29F) | 2 | Retracting clutches | Surround retracting clutch sleeves (29G), keyed to them. | F. S. No. C. | 1 right, 1 left; 48 clutch teeth on forward end, with an outside diameter of 13 inches. |
| (30F and 30G) | 2 | Retracting clutch covers (outside) | Surround retracting clutches | C. S. No. 2. | 1 right, 1 left. |
| (30D and 30E) | 2 | Retracting clutch covers (inside) | do | C. S. No. 2. | Do. |
| (32G and 32H) | 2 | Retracting clutch levers | Pivoted above retracting clutches (29E and 29F), surrounding them, and extending 30.5 inches below them. | F. S. No. 2. | Do. |
| (32A) | 2 | Retracting clutch lever pins | At pivot of retracting clutch levers (32G and 32H). | Bz. | |
| (32D) | 4 | Retracting clutch lever studs | In retracting clutch levers (32G and 32H) engaging groove in retracting clutches (29E and 29F). | F. S. | |
| (29B and 29C) | 2 | Retracting clutch pinions | Engage in racks of guide clips (27J and 27K). | F. S. No. C. | Do. |
| (29J) | 2 | Retracting clutch shafts | In three bearings in chassis parallel to them. | F. S. No. C. | |
| (30Y) | 2 | Retracting clutch shaft plugs | In front of retracting clutch shaft (29J) | Bz. | |
| (29G) | 2 | Retracting clutch sleeves | On retracting clutch shafts in rear of retracting clutch pinions (29B and 29C). | F. S. No. 2. | Fixed to shaft by 12 feathers. |
| (29E) | 12 | Retracting clutch springs | In retracting clutches (29E and 29F) | S. | Act against flange on rear of retracting clutch sleeves (29G). |
| (29Y) | 2 | Retracting cranks | At extremities of retracting crank shaft (29X). | F. S. No. 2. | Leverage 14 inches; handle 17 inches long. |
| (29X) | 1 | Retracting crank shaft | Extends through chassis at about the center of carriage. | F. S. No. 2. | 125.5 inches long, 2 inches in diameter, with squared extremities. |
| (30A) | 2 | Retracting crank shaft brackets | Support retracting crank shaft (29X) outside of chassis. | C. I. No. 2. | |
| (29AA) | 2 | Retracting crank shaft pinions | On retracting crank shaft inside of chassis | F. S. No. 3. | 13 teeth. |
| (29N) | 2 | Retracting intermediate gears | On retracting intermediate shaft (29B) inside of retracting bevel pinion (29M). | C. S. No. 2. | 122 teeth. |
| (29V) | 1 | Retracting intermediate shaft | Between chassis in rear of center of carriage. | F. S. No. 2. | 48.75 inches long, 2.125 inches in diameter. |
| (30P and 30Q) | 2 | Retracting intermediate shaft brackets | Bolted to inside of chassis | C. S. No. 2. | 1 right, 1 left. |
| (29R) | 1 | Retracting pawl lever | Outside of left chassis at extremity of pawl shaft (29Q). | F. S. No. 2. | |
| (29Q) | 1 | Retracting pawl shaft | Seated in left chassis 4.5 inches in rear of center of carriage. | F. S. No. 3. | 11.625 inches long, 1.625 inches diameter. |
| (29S and 29T) | 2 | Retracting pawls | Inside of chassis at extremity of retracting pawl shaft (29Q). | F. S. No. 2. | 1 inside, 1 outside; pinned and keyed to shaft. |
| (29P) | 1 | Retracting pawl stud | Above retracting pawls (29S and 29T) | F. S. No. 2. | To limit upward motion of pawls. |
| (29Z) | 1 | Retracting ratchet wheel | On retracting crank shaft inside of left chassis. | C. S. No. 2. | 50 teeth. |
| (16W1) | 3 | Retracting and traversing crank retaining catches. | Inside of hubs of retracting and traversing cranks. | S. | |

*Names of parts of 6-inch disappearing carriage, L. F., model of 1905, their piece marks, location, and material of which they are made*—Continued.

CARRIAGE PROPER—Continued.

| Piece mark. | Number. | Name of part. | Location. | Material. | Remarks. |
|---|---|---|---|---|---|
| (10GA) | 2 | Rings, wire spring | Around glands of recoil cylinder stuffing boxes. | S. | To hold halves of gland together. |
|  | 1 | Rivet | Hinge pivot of hasp (10AA) | S. |  |
|  | 2 | Rivets | Elevating shaft (13A) | S. | For securing key. |
|  | 2 | do | Traversing crank shaft (16J2) | S. | For securing keys. |
|  | 4 | do | Traversing clutch rod (18N1) | S. | For securing clutch rod ends (18S). |
|  | 4 | do | Pinch bar supports on sighting platform | S. |  |
|  | 2 | do | Telautograph plate on sighting platform | S. |  |
|  | 75 | Rivets, 0.375 inch | Sighting platform | S. |  |
|  | 12 | Rivets | Bottom plate liners (27A) | Bz. |  |
|  | 32 | do | Crosshead liners (27S) and (27T) | Bz. |  |
|  | 14 | do | Liners (H12B and H12D) to elevating slide (H12C). | Br. |  |
|  | 8 | Rivets, 0.375 inch | Fish plates (H4H) to outer dust guard (H4D) | S. |  |
| (H6F) | 18 | Rollers, recoil | Between top carriage and chassis | F. S. No. 3. | Unflanged; 4.5 inches long by 3.429 inches in diameter. |
| (H6D) | 18 | do | do | F. S. No. 3. | Flanged; 4.1 inches between flanges and 3.429 inches in diameter. |
| (H6K) | 36 | Roller axles | In recoil rollers (H6D and H6F) | F. S. No. 3. | 8.312 inches long. |
| (H6V) | 36 | Roller-axle nuts | At outside end of roller axles (H6K) | S. |  |
| (H6N and H6P) | 4 | Roller-cage side frames | Ends of roller axles (H6K) | F. S. No. 2. | 2 inside, 2 outside. |
| (H12F and H12G) | 2 | Rope clamps | Bolted to elevating slide nut (H12H) | S. | 1 right, 1 left; to secure rope of counterbalance device. |
| (23A) | 2 | Roller bearings | Elevating gear | S. | Diameter of shaft, 1.5 inches. |
| (23B) | 5 | do | Elevating and traversing gear | S. | Diameter of shaft, 1.75 inches. |
| (23C) | 4 | do | Traversing gear | S. | Diameter of shaft, 2 inches. |
| (23D) | 6 | do | Retracting gear | S. | Diameter of shaft, 2 inches, without sleeve on shaft. |
| (23E) | 2 | do | Traversing gear | S. | Diameter of shaft, 2.125 inches. |
| (23F) | 6 | do | Retracting gear | S. | Diameter of shaft, 3.125 inches, without sleeve on shaft. |
| (32J) and (32K) | 2 | Safety latches | Pivoted inside of chassis | F. S. No. 2. | Engage lugs on retracting clutch levers (32G) and (32H). |
| (32Q) | 1 | Safety-latch handle | Outside of left chassis, near the bottom | F. S. | For purpose of raising the safety latches. |
| (32S) | 2 | Safety-latch pawl springs | Behind safety-latch pawls (32T) | S. |  |
| (32T) | 2 | Safety-latch pawls | Rear and outside of crosshead | Bz. | Engage forward end of safety latches (32J) and (32K). |
| (32E) | 1 | Safety-latch shaft | Extends between the chassis 9.228 inches in rear of the center. | F. S. | 76.5 inches long, 1.496 inches in diameter. |
|  | 3 | Screws, spring catch | Retaining catches (16W1) | S. |  |
| (25P) | 2 | Separators | Left chassis | C. I. | For tap bolts securing outlet box. |

| | | | | | |
|---|---|---|---|---|---|
| (H13K) | 2 | Sheaves, lower guide | Counterbalance device | C. I. No. 1. | 9.5 inches outside diameter. |
| (H13J) | 2 | Sheaves, upper guide | Rear transom | C. I. No. 1. | 9.5 inches outside diameter, for counterbalance device. |
| (22F) | 1 | Shoulder rest | Sighting platform | C. I. No. 1. | Bolted to shoulder-rest bracket (22B) |
| (22B) | 1 | Shoulder-rest bracket | do | C. I. No. 1. | Bolted to sight standard. |
| (20E) | 2 | Sight-arm bracket pins | In sight-arm bracket (20D) | S. | For supporting sight arm. |
| (21B2) | 1 | Sighting platform floor | Sighting platform | S. | |
| (21M) | 1 | Sighting platform ladder | Rear of sighting platform | S. | 2 sides and 4 rounds. |
| (20B1) | 1 | Sight standard | Bolted to left chassis near front | C. S. No. 2. | Supports sight and forward end of sighting platform. |
| (13G) | 2 | Sleeves | For elevating handwheel (13J) and slow-motion elevating handwheel (13E). | Bz. | |
| (16S) | 1 | Sleeve | Traversing handwheel (16R) | Bz. | |
| (13C) | 1 | do | On elevating shaft (13A) | Bz. | Inside of elevating connecting-shaft gear (14L). |
| (15A) | 1 | Slide | Elevation and range scale | Bz. No. 2. | Carries elevation and range scales; 28.875 inches long. |
| | 2 | Split pins | Rear transom | S. | For studs (8M). |
| | 1 | Split pin | Lower end of piston rod | S. | For nut (10S). |
| | 1 | do | do | S. | For taper pin of nut (10R). |
| | 1 | do | Elevating band | S. | For pin (12K). |
| | 2 | Split pins | do | S. | For taper pins securing band trunnions (12C). |
| | 2 | do | do | S. | For nuts of bolts (12J). |
| | 5 | do | Elevating shaft (13A) | S. | For taper pins of collars (13B) and gear (14L). |
| | 1 | Split pin | do | S. | For nut (13D) on left end of shaft. |
| | 1 | do | Elevating connecting shaft bearing (upper) (14X). | S. | For securing elevating clutch fork pivot (14Q). |
| | 2 | Split pins | Elevating connecting shaft (14CA) | S. | For taper pins of collars (14BA). |
| | 1 | Split pin | Slow-motion elevating handwheel shaft (14EA1). | S. | For nut securing gear. |
| | 2 | Split pins | Elevating connecting shaft (14CA) | S. | For nuts at ends of shaft. |
| | 1 | Split pin | Elevating clutch shifter rod (14C) | S. | For nut (14A) securing shifter (14B). |
| | 1 | do | slow motion elevating handwheel shaft (14EA1). | S. | For nut securing handwheel. |
| | 1 | do | Traversing handwheel shaft (16A1) | S. | For taper pin of collar (16D). |
| | 2 | Split pins | Traversing intermediate shaft (16E1) | S. | For taper pins of collars (16G) and (16H). |
| | 1 | Split pin | do | S. | For nut (16B) securing gear at lower end. |
| | 2 | Split pins | Traversing pinion shaft (16L) | S. | For nuts (16M) at extremities. |
| | 1 | Split pin | Traversing handwheel shaft (16A1) | S. | For nut (16C) securing gear. |
| | 1 | do | Traversing intermediate shaft (16E1) | S. | For nut (16F) securing gear at upper end. |
| | 1 | do | do | S. | For nut securing gear at lower end. |
| | 7 | Split pins | Traversing crank shaft (16J2) | S. | For taper pins securing gear and collars. |
| | 1 | Split pin | Traversing clutch fork (18C1) | S. | For taper pin securing traversing clutch lever (18V1). |
| | 1 | do | Traversing clutch plunger | S. | For securing taper pin securing foot piece (18P). |
| | 3 | Split pins | Clutch rod pins (18T) | S. | |
| | 2 | do | Traversing clutch shaft (18CA) | S. | For securing taper pins. |
| | 2 | do | Sight-arm bracket pins (20E) | S. | For securing nuts (20F). |
| | 8 | do | Suspension rods (27R) | S. | For securing nuts (27U). |
| | 2 | do | Retracting crank shaft (29Y) | S. | For taper pins of collars (29W). |
| | 1 | Split pin | Retracting pawl lever (29R) | S. | For securing taper pin of lever. |

| Piece mark. | Number. | Name of part. | Location. | Material. | Remarks. |
|---|---|---|---|---|---|
| (16GA) | 2 | Rings, wire spring | Around glands of recoil cylinder stuffing boxes. | S. | To hold halves of gland together. |
| | 1 | Rivet | Hinge pivot of lamp (16hA) | S. | |
| | 2 | Rivets | Elevating shaft (13A) | S. | For securing key. |
| | 2 | do | Traversing crank shaft (16Q) | S. | For securing keys. |
| | 4 | do | Traversing clutch rod (15K) | S. | For securing clutch rod ends (16). |
| | 4 | do | Pinch bar supports on sighting platform | S. | |
| | 2 | do | Telautograph plate on sighting platform | S. | |
| | 75 | Rivets, 0.375 inch | Sighting platform | S. | |
| | 12 | Rivets | Bottom plate liners (27A) | Bz. | |
| | 32 | do | Crosshead liners (27S) and (27T) | Bz. | |
| | 14 | do | Liners (H12B and H12D) in elevating slide (H12). | Br. | |
| | 8 | Rivets, 0.375 inch | Fish plates (H41) to outer dust guard (H41) | S. | |
| | 18 | Rollers, recoil | Between top carriage and chassis | F. S. No. 4. | Unflanged; 4.5 inches long by 3.420 inches in diameter. |
| | 18 | do | do | F. S. No. 3. | Flanged; 4.1 inches between flanges and 3.420 inches in diameter. |
| | [illegible] | [illegible] axles | In recoil rollers (H6J and H6F) | F. S. No. 3. | 6.312 inches long. |
| | [illegible] | [illegible] axle nuts | At outside end of roller axles (H6K) | S. | |
| | [illegible] | [illegible] side frames | Ends of roller axles (H6K) | F. S. No. 2. | 2 inside, 2 outside. |
| | [illegible] | [illegible] | Bolted to elevating slide nut (H12H) | S. | 1 right, 1 left; to secure rope of counterbalance device. |
| | [illegible] | [illegible] | Elevating gear | S. | Diameter of shaft, 1.5 inches. |
| | [illegible] | [illegible] | Elevating and traversing gear | S. | Diameter of shaft, 1.75 inches. |
| | [illegible] | [illegible] | Traversing gear | S. | Diameter of shaft, 2 inches. |
| | [illegible] | [illegible] | Retracting gear | S. | Diameter of shaft, 2 inches, without sleeve on shaft. |
| | [illegible] | [illegible] | Traversing gear | S. | Diameter of shaft, 2.125 inches. |
| | [illegible] | [illegible] | Retracting gear | S. | Diameter of shaft, 2.125 inches, without sleeve on shaft. |
| | [illegible] | [illegible] | Pivoted inside of chassis | F. S. No. 2. | Engage lugs on retracting clutch levers (32G) and (32H). |
| | [illegible] | [illegible] | Outside of left chassis, near the bottom | F. S. | For purpose of raising the safety latches. |
| | [illegible] | [illegible] | Behind safety-latch pawls (32T) | S. | |
| | [illegible] | [illegible] | Rear and outside of crosshead | Bz. | Engage forward end of safety latches (32J) and (32K). |
| | [illegible] | [illegible] | Extends between the chassis 9.925 inches in rear of the center. | F. S. | 76.5 inches long, 1.490 inches in diameter. |
| | [illegible] | [illegible] | Retaining catches (16W1) | S. | |
| | [illegible] | [illegible] | [illegible] Chassis | C. I. | For tap bolts securing outlet box. |

| | | |
|---|---|---|
| | C. I. No. 1. | |
| (30D) | C. I. No. 1. | bolted to shoulder-rest bracket (32H) |
| | S. | bolted to sight standard. |
| (30) | S. | For supporting sight arm. |
| rear front | C. S. No. | sides and 4 rollers |

| | | | | |
|---|---|---|---|---|
| | [illegible] | Counterbalance device | C. I. No. 1. | 9.5 inches outside diameter. |
| | [illegible] | Rear transom | C. I. No. 1. | 9.5 inches outside diameter, for counterbalance device. |
| | [illegible] | Sighting platform | C. I. No. 1. | Bolted to shoulder-rest bracket (22B) |
| | [illegible] | do. | C. I. No. 1. | Bolted to sight standard. |
| | [illegible] | In sight-arm bracket (20D) | S. | For supporting sight arm. |
| | [illegible] | Sighting platform | S. | |
| | [illegible] | Rear of sighting platform | S. | 2 sides and 4 rounds. |
| | [illegible] | Bolted to left chassis near front | C. S. No. 2. | Supports sight and forward end of sighting platform. |
| | [illegible] | For elevating handwheel (13J) and slow-motion elevating handwheel (13E). | Bz. | |
| | [illegible] | Traversing handwheel (16R) | Bz. | |
| | [illegible] | On elevating shaft (13A) | Bz. | Inside of elevating connecting-shaft gear (14L). |
| | [illegible] | Elevation and range scale | Bz. No. 2. | Carries elevation and range scales; 28.875 inches long. |
| | [illegible] | Rear transom | S. | For studs (8M). |
| | [illegible] | Lower end of piston rod | S. | For nut (10S). |
| | [illegible] | do. | S. | For taper pin of nut (10R). |
| | [illegible] | Elevating band | S. | For pin (12K). |
| | [illegible] | do. | S. | For taper pins securing band trunnions (12C). |
| | do. | do. | S. | For nuts of bolts (12J). |
| | do. | Elevating shaft (13A) | S. | For taper pins of collars (13B) and gear (14L). |
| | [illegible] pin | do. | S. | For nut (13D) on left end of shaft. |
| | do. | Elevating connecting shaft bearing (upper) (14X). | S. | For securing elevating clutch fork pivot (14Q). |
| | Split pins | Elevating connecting shaft (14CA) | S. | For taper pins of collars (14BA). |
| 1 | Split pin | Slow-motion elevating handwheel shaft (14EA1). | S. | For nut securing gear. |
| 2 | Split pins | Elevating connecting shaft (14CA) | S. | For nuts at ends of shaft. |
| 1 | Split pin | Elevating clutch shifter rod (14C) | S. | For nut (14A) securing shifter (14B). |
| 1 | do. | slow motion elevating handwheel shaft (14EA1). | S. | For nut securing handwheel. |
| | do. | Traversing handwheel shaft (16A1) | S. | For taper pin of collar (16D). |
| | [illegible] | Traversing intermediate shaft (16E1) | S. | For taper pins of collars (16G) and (16H). |
| | [illegible] | do. | S. | For nut (16B) securing gear at lower end. |
| | [illegible] | Traversing pinion shaft (16L) | S. | For nuts (16M) at extremities. |
| | [illegible] | Traversing handwheel shaft (16A1) | S. | For nut (16C) securing gear. |
| | [illegible] | Traversing intermediate shaft (16E1) | S. | For nut (16F) securing gear at upper end. |
| | [illegible] | do. | S. | For nut securing gear at lower end. |
| | [illegible] | Traversing crank shaft (16J2) | S. | For taper pins securing gear and collars. |
| | [illegible] | Traversing clutch fork (18U1) | S. | For taper pin securing traversing clutch lever (18V1). |
| | [illegible] | Traversing clutch plunger | S. | For securing taper pin securing foot piece (18P). |
| | [illegible] | Clutch rod pins (18T) | S. | |
| | [illegible] | Traversing clutch shaft (18CA) | S. | For securing taper pins. |
| | [illegible] | Sight-arm bracket pins (20E) | S. | For securing nuts (20F). |
| | [illegible] | Suspension rods (27R) | S. | For securing nuts (27U). |
| | [illegible] | Retracting crank shaft (29Y) | S. | For taper pins of collars (29W). |
| | [illegible] | Retracting pawl lever (29R) | S. | For securing taper pin of lever. |

*Names of parts of 6-inch disappearing carriage, L. F., model of 1905, their piece marks, location, and material of which they are made*—Continued.

CARRIAGE PROPER—Continued.

| Piece mark. | Number. | Name of part. | Location. | Material. | Remarks. |
|---|---|---|---|---|---|
| (15A) | 2 | Split pins | Retracting clutch shafts (29J) | S. | For taper pins of collars (29K). |
| | 2 | do | Tripping lever shaft (32B) | S. | For taper pins of collars (32C). |
| | 2 | do | Safety latch shaft (32E) | S. | For collars (32F). |
| | 1 | Split pin | do | S. | For securing safety latch handle (32Q). |
| | 4 | Split pins | Tripping rod pins (32M) | S. | For securing the pins. |
| | 1 | Split pin | Tripping lever shaft (32B) | S. | At left extremity for securing tripping lever. |
| | 1 | do | Elevating screw (H12A) | S. | For securing taper pin. |
| | 2 | Split pins | Retracting clutch lever pins (32A) | S. | For securing the pins. |
| | 2 | do | Safety latches (32J) and (32K) | S. | For taper pins securing the latches. |
| | 1 | Split pin | Elevating slide stop (H12N) | S. | For securing nut. |
| | 1 | do | Spring compressing nut (H12K) | S. | For securing taper pins. |
| | 2 | Split pins | Lower guide-sheave axle (H13S) | S. | Do. |
| | 2 | do | Equalizing bar pin (H13P) | S. | For securing bar. |
| | 1 | Split pin | Rear clip and traversing bracket (H13M) | S. | For securing taper pin in bearing of lower guide-sheave axle (H13S). |
| | 4 | Split pins | Rope socket pins (H13Q) | S. | For securing the pins. |
| | 1 | Split pin | Equalizing bar fork (H13D) | S. | For securing nut (H13C). |
| | 2 | Split pins | Upper guide-sheave axle (H13T) | S. | For securing the axle. |
| (H12J) | 1 | Spring, elevating slide | Around elevating slide nut (H12H) | S. | 12.8 inches free height, 10.5 inches assembled height under 2,000 pounds. |
| (18R) | 1 | Spring stirrup | Sighting platform | Bz. | Supports traversing clutch plunger and clutch-rod spring (18W). |
| | 10 | Staples | Counterweight | F. S. | For seventh and eighth layers. |
| | 12 | do | do | F. S. | For first six layers. |
| | 2 | do | do | F. S. | For bottom plate. |
| (16T) | 1 | Stem | Traversing handwheel (16R) | S. | Riveted into rim of handwheel; sleeve (16S) turns on it. |
| (13F) | 1 | do | Slow-motion elevating handwheel (16E) | S. | Riveted into rim of handwheel. |
| (15H) | 1 | do | Elevating handwheel | S. | Do. |
| | 4 | Strips | Outer dust guard | F. | |
| | 4 | do | Inner dust guard | F. | |
| (H4G) | 1 | Strip | Outer dust guard | S. | In four pieces, for securing felt. |
| (22D) | 1 | Strip, nut | Shoulder rest (22F) | Bz. | For securing rubber tubing (22C). |
| (27R) | 4 | Suspension rods | Counterweight | F. S. No. 3. | For carrying counterweight, 73.25 inches long by 3 inches diameter. |
| | 1 | Taper pin | Lower end of recoil piston rod | S. | For nut (10R). |
| | 1 | do | Elevating slide (H12C) | S. | For spring compressing nut (H12K). |
| | 2 | Taper pins | Elevating band | S. | For band trunnions (12C). |
| | 1 | Taper pin | Elevating shaft (13A) | S. | For pinion (17F). |
| | 4 | Taper pins | do | S. | For collars (13B). |
| | 2 | do | Elevating connecting shaft (14CA) | S. | For collars (14BA). |
| | 1 | Taper pin | Elevating clutch shifter-rod handle (14K) | S. | For securing handle. |

| | | | | | |
|---|---|---|---|---|---|
| | 6 | Taper pins | Traversing crank shaft (16J2) | S. | For collars (16K). |
| | 2 | .....do | Traversing intermediate shaft (16E1) | S. | For collars (16G) and (16H). |
| | 1 | Taper pin | Traversing handwheel shaft (16A1) | S. | For collar (16D). |
| | 1 | .....do | Traversing crank shaft (16J2) | S. | For pinion (17B). |
| | 2 | Taper pins | Traversing clutch shaft (18CA) | S. | At extremities of shaft. |
| | 1 | Taper pin | Traversing clutch fork (18U1) | S. | For securing traversing clutch lever (18V1). |
| | 1 | .....do | Traversing clutch plunger | S. | For securing foot piece (18P) to end (18X). |
| | 2 | Taper pins | Retracting clutch shafts (29J) | S. | For securing collars (29K). |
| | 2 | .....do | Retracting crank shaft (29X) | S. | For securing collars (29W). |
| | 1 | Taper pin | Retracting pawl lever (29R) | S. | For securing it to its shaft. |
| | 2 | Taper pins | Tripping lever shaft (32B) | S. | For securing collars (32C). |
| | 1 | Taper pin | Elevating screw (H12A) | S. | For securing gear (17E). |
| | 2 | Taper pins | Safety latches (32J) and (32K) | S. | |
| | 2 | .....do | Safety latch shaft (32E) | S. | For securing collars (32F). |
| | 1 | Taper pin | Rear clip and traversing bracket | S. | For securing lower guide-sheave axle (H13S). |
| | 2 | Taper pins | Lower guide-sheave axle (H13S) | S. | For collars (H13L). |
| | 3 | Tees | Sighting platform | M. I. | For railing. |
| (H3F) | 12 | Thrust plates | Underneath base ring | S. | To provide bearing for leveling screws. |
| (H6U) | 1 | Top carriage | On recoil rollers | C. S. No. 2. | |
| (8H) | 1 | Transom cap | Rear transom | C. S. No. 1. | Forms double thrust bearing for elevating screw. |
| (8A1) | 1 | Transom, front | Front of carriage between chassis | C. S. No. 1. | |
| (8B) | 1 | Transom, rear | Rear of carriage between chassis | C. S. No. 1. | |
| (H13M1) | 1 | Traversing bracket | Rear clip and bolted to racer and rear transom at middle of carriage. | C. S. No. 1. | Supports traversing pinion shaft (16L), traversing crank shaft (16J2), and lower guide sheave axle (H13S). |
| (16AA1) | 1 | Traversing clutch | Left end of traversing crank shaft (16J2) | F. S. No. 1. | For disengaging slow motion traversing gear. |
| (18U1) | 1 | Traversing clutch fork | Engages traversing clutch (16AA1) | F. S. | For shifting clutch. |
| (17S1) | 1 | Traversing clutch gear | Left end of traversing crank shaft (16J2) inside of clutch. | C. I. No. 1. | 64 teeth; has lugs which engage clutch; when not engaged gear turns freely on shaft. |
| (18V1) | 1 | Traversing clutch lever | Between traversing clutch rod and traversing clutch fork (18U1). | F. S. | |
| (17T1) | 1 | Traversing clutch pinion | Lower end of traversing intermediate shaft (16E1). | F. S. | 20 teeth. |
| (18X) | 1 | Traversing clutch plunger end | Seated in spring stirrup (18R), on sighting platform. | S. | |
| (18P) | 1 | Traversing clutch plunger foot piece | Pinned to upper end of end (18X) | Bz. | |
| (18N1) | 1 | Traversing clutch rod tooth | Between traversing clutch shaft lever (18FA) and traversing clutch lever (18V1). | S. | Seamless cold drawn tubing 36.75 inches long between centers of ends (18S). |
| (18Z) | 2 | Traversing clutch shaft bearings | Bolted to underside of sighting platform | C. I. No. 1. | Support traversing clutch shaft (18CA). |
| (18FA) | 1 | Traversing clutch shaft lever | Between traversing clutch rod and traversing clutch shaft (18CA). | F. S. | 4 inches between centers. |
| (18CA) | 1 | Traversing clutch shaft | In traversing clutch shaft bearings (18Z) | F. S. | 37.5 inches long, 1 inch in diameter. |
| (16V) | 1 | Traversing crank | Right side of carriage on traversing crank shaft (16J2). | F. S. | 14 inches leverage, 12-inch handle. |
| (16J1) | 1 | Traversing crank shaft | Rests in bearings in chassis 41.6 inches in rear of center of carriage. | F. S. | 94 inches long, 2 inches diameter. |
| (17A) | 1 | Traversing crank shaft gear | Traversing pinion shaft (16L) | C. I. No. 1. | 90 teeth. |
| (19F) | 1 | Traversing crank shaft gear cover | Surrounds traversing crank gears in center of carriage. | C. I. | In halves. |
| (19D1) | 1 | Traversing intermediate shaft gear cover. | Surrounds traversing clutch gears at left extremity of traversing crank shaft (16J2). | G. I. | In halves; also contains bearing for traversing clutch fork (18U1). |

*Names of parts of 6-inch disappearing carriage, L. F., model of 1905, their piece marks, location, and material of which they are made*—Continued.

CARRIAGE PROPER—Continued.

| Piece mark. | Number. | Name of part. | Location. | Material. | Remarks. |
|---|---|---|---|---|---|
| (H4C) | 48 | Bearings | Distance ring | Bz. 3. | For traversing rollers. |
| (27W) and (27X) | 16 | Clip bolts and nuts | Crosshead | F. S. 2. | 10 long and 6 short, for securing guide clips. |
| (27A) | 2 | Bottom plate liners | Bottom plate | Bz. 4. | 8 by 7.5 by 0.325 inch. |
| (27G) | 1 | Bottom plate | Counterweight well | C. S. 1. | |
| (27P) | 4 | Bottom plate gibs | Clips of bottom plate | Bz. 4. | 7.5 inches long. |
| (10Z) | 1 | Bracket, hasp | Recoil valve | Bz | Attached to piston-rod bracket. |
| (20D1) | 1 | Bracket, sight arm | Top of sight standard | C. S. 1. | |
| | 1 | Brace, corner, 120 degree angle | Sighting platform | S. | For left rear corner. |
| (25E1) | 2 | Braces (lower) | Lower end of sight standard | S. | For attaching telephone. |
| (25F1) | 2 | Braces (upper) | ....do | S. | Do. |
| | 3 | Corner braces | Sighting platform | S. | At corners of platform angles. |
| (6F) | 1 | Bushing | Right chassis | Bz. | For tripping lever shaft. |
| (7H) | 1 | ....do | Left chassis | Bz. | For safety latch shaft. |
| (7F) | 1 | ....do | ....do | Bz. | For tripping lever shaft. |
| (7G) | 1 | ....do | ....do | Bz. | For retracting pawl shaft. |
| (8J) | 1 | ....do | Rear transom | Bz. No. 2. | For elevating screw. |
| (8D) | 1 | ....do | Elevating screw support | Bz. | For elevating screw, lower end. |
| (6J) | 1 | ....do | Right chassis | Bz. | For safety latch shaft. |
| (10W1) | 1 | ....do | Lower cylinder head | Bz. No. 4. | At upper end of stuffing box. |
| (10D1) | 1 | ....do | Upper cylinder head | Bz. No. 4. | At lower end of stuffing box. |
| (12L) | 2 | Bushings | Elevating arm | Bz. | For band trunnions. |
| (14B1) | 1 | Bushing | Left rear of carriage | Bz. | In elevating connecting shaft bearing (lower). |
| (17R) | 1 | ....do | On traversing crank shaft | Bz. No. 2. | In traversing clutch gear. |
| (18E) | 1 | ....do | Sight standard | Bz. | In traversing intermediate shaft bearing (upper) for traversing handwheel shaft. |
| (22K) | 1 | ....do | ....do | Bz. | In traversing handwheel shaft bearing. |
| (29D) | 2 | Bushings | Retracting gear | Bz. No. 4. | For retracting clutch pinions |
| (29U) | 2 | ....do | ....do | Bz. | For inside retracting pawl (29S). |
| (30H) | 2 | ....do | ....do | Bz. | Retracting clutch cover. In halves, 8.75 inches in diameter. |
| (30J) | 2 | ....do | ....do | Bz. | Retracting clutch cover. In halves, 8 inches in diameter |
| (H6B) | 36 | ....do | In flanged recoil rollers | Bz. | |
| (H6C) | 36 | ....do | In unflanged recoil rollers | Bz. | |
| (H6S and H6T) | 2 | Bushings, axle bed | Top carriage | Bz. No. 3. | |
| (H9E) | 2 | Bushings | Gun levers | Bz. No. 3. | 8 inches diameter, for gun lever pins. |
| (H9G) | 2 | ....do | ....do | Bz. No. 3. | In halves, for gun trunnion, 7 inches diameter. |
| (H12E) | 2 | ....do | Elevating slide | Bz. | For elevating pin. |
| (H13G) | 2 | ....do | Upper guide sheaves | Bz. | |
| (H13H) | 2 | ....do | Lower guide sheaves | Bz. | |
| (H9C and H9D) | 2 | Cap squares | Gun levers | C. S. No. 2. | For gun trunnions. |

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|---|---|---|---|---|---|
| (7A1) | 1 | Chassis, left | Bolted to racer | C. I. No. 2. | |
| (6A1) | 1 | Chassis, right | do | C. I. No. 2. | |
| (H4E) | 4 | Clamps | Outer dust guard | S. | Uniting sections. |
| | 2 | Clevises | Rope of counterbalance device | F. S. | |
| (8E1) | 2 | Clips, front | Front of racer to the inside of front transom | C. S. No. 2. | Engage over flange on base ring. |
| (18S) | 2 | Clutch rod ends | Traversing clutch | F. S. | Riveted to clutch rod. |
| (18T) | 3 | Clutch rod pins | Traversing clutch mechanism | Bz. | For connecting clutch rod to other parts. |
| (18W) | 1 | Clutch rod spring | Sighting platform | S. S. | Surrounds traversing clutch plunger. |
| | 1 | Collar | Drain plug | Br. | Brazed to spout. |
| (13B) | 4 | Collars | Elevating shaft | Bz. | Close ends of bearings. |
| (H13L) | 2 | do | Lower guide sheave axle | S. | |
| (14BA) | 2 | do | Elevating connecting shaft | Bz. | For closing ends of bearings. |
| (14D) | 1 | Collar | Elevating connecting shaft pinion | Bz. | |
| (14E) | 1 | do | Elevating connecting shaft gear | Bz. | |
| (16D) | 1 | do | Traversing handwheel shaft | Bz. | |
| (16H) | 1 | do | Traversing intermediate shaft, lower end | Bz. | |
| (16G) | 1 | do | Traversing intermediate shaft, upper end | Bz. | |
| (16K) | 6 | Collars | Traversing crank shaft | Bz. | To close ends of bearings. |
| (16BA) | 1 | Collar | Traversing crank shaft, left end | F. S. No. 3. | To prevent longitudinal movement of traversing clutch gear. |
| (29W) | 2 | Collars | Retracting crank shaft | Bz. | To close ends of bearings in chassis. |
| (29K) | 2 | do | do | Bz. | In rear of middle bearing. |
| (32C) | 2 | do | Tripping lever shaft | Bz. | To close ends of bearings. |
| (32F) | 2 | do | Safety latch shaft | Bz. | Do. |
| (27F) | 6 | Layers of counterweight, first to sixth, inclusive. | In counterweight well | C. I. | |
| (27D) | 2 | Pieces of counterweight, side, seventh layer. | Counterweight | C. I. | |
| (27E) | 1 | Piece of counterweight, inside, seventh layer. | do | C. I. | |
| (27C) | 2 | Pieces of counterweight, eighth layer | do | C. I. | |
| (15L) | 1 | Cover | Elevation and range scale and pointer | C. I. No. 2. | Bolted to base. |
| (7D) | 3 | Crank hooks | On chassis | F. S. | To hang cranks. |
| (21F) | 2 | Crosses | Sighting platform | M. I. | For railing. |
| (27B) | 1 | Crosshead | Above counterweight | C. S. No. 1. | |
| (27L and 27M) | 2 | Crosshead gibs | Guide clips | Bz. No. 4. | 0.725 inch thick with oil hole and groove, 1 right, 1 left. |
| (27N) | 2 | do | do | Bz. No. 4. | 0.485 inch thick without oil hole and groove on front surface of guide clip. |
| (27S and 27T) | 2 | Crosshead liners | do | Bz. No. 4. | 1 right, 1 left, 67 by 8.25 by 0.235 inch. |
| (10X1) | 1 | Cylinder head, lower | Recoil cylinder | F. S. No. 3. | Attached to bottom plate. |
| (10C1) | 1 | Cylinder head, upper | do | F. S. No. 3. | |
| (23Q1 and 23R1) | 2 | Direction plates, retracting | At retracting cranks | Bz. | 1 right, 1 left. |
| (23T) | 1 | Direction plate, traversing | At traversing crank | Bz. | |
| (23U) | 2 | Direction plates, depress | On elevating handwheel (13J) | Bz. | |
| (23V) | 2 | Direction plates, elevate | do | Bz. | |
| (H4A) | 1 | Distance ring | Between racer and base ring | C. S. No. 2. | Holds traversing rollers in alignment. |
| (15M) | 1 | Dog | Bolted to left side of elevating slide (H12C) | C. S. No. 1. | A part of elevation and range scale and pointer. |
| (H4D) | 1 | Dust guard, outer | Bolted to base ring | S. | In four sections. |
| (H4J) | 1 | Dust-guard strip, inner | do | S. | Do. |
| (21D) | 5 | Elbows | Railing of sighting platform | M. I. | |

*Names of parts of 6-inch disappearing carriage, L. F., model of 1905, their piece marks, location, and material of which they are made*—Continued.

CARRIAGE PROPER—Continued.

| Piece mark. | Number. | Name of port. | Location. | Material. | Remarks. |
|---|---|---|---|---|---|
| (12A) | 1 | Elevating arm | From rear transom to breech of gun | C. S. No. 2. | 105 inches long. |
| (12B) | 1 | Elevating band | Around breech of gun | C. S. No. 1. | In two halves, hinged at top and bolted at bottom. |
| (14S) | 1 | Elevating clutch | On elevating shaft inside of left chassis | F. S. No. 2. | To permit use of slow-motion elevating gearing. |
| (14FA) | 1 | Elevating clutch fork | Inside of rear of left chassis | F. S. No. 1. | To shift elevating clutch. |
| (14Q) | 1 | Elevating clutch fork pivot | Screwed into elevating connecting shaft bearing (upper). | F. S. No. 1. | |
| (14C) | 1 | Elevating clutch shifter rod | At rear end of left chassis | F. S. No. 1. | Supported in 14J. |
| | 1 | Elevating clutch shifter rod bearing | do | Bz. No. 2. | |
| (14B) | 1 | Elevating clutch shifter | At right end of elevating clutch shifter rod 14C. | F. S. No. 1. | |
| (14K) | 1 | Elevating clutch shifter rod handle | At left end of 14C | Bz. No. 2. | |
| (14CA) | 1 | Elevating connecting shaft | Inside of rear of left chassis | F. S. No. 1. | 23.348 inches long, 1.5 inches in diameter. |
| (14W1) | 1 | Elevating connecting shaft bearing (lower). | Rear end of left chassis | C. I. No. 1. | Has bearings for shaft 14EA1 and for shaft 14CA. |
| (14X) | 1 | Elevating connecting shaft bearing (upper). | Bolted to inside of rear of left chassis | C. I. No. 1. | Has bearing for upper end ot shaft 14CA and for pivot 14Q. |
| (14L) | 1 | Elevating connecting shaft gear | On elevating shaft inside of left chassis | F. S. No. 2. | 42 teeth; 3 clutch teeth on right end engaging elevating clutch. |
| (14Z) | 1 | Elevating connecting shaft-gear cover | Surrounds gears 14L and 14M | C. I. | In halves. |
| (14M) | 1 | Elevating connecting shaft pinion | Keyed to upper end of connecting shaft 14CA. | Bz. No. 1. | 24 teeth. Engages gear 14L. |
| (17Y) | 1 | Elevating gear cover | Around gears 17E and 17F | C. I. | In halves. |
| (8F and 8G) | 2 | Elevating gibs | Bolted to rear transom | C. S. No. 1. | 1 right, 1 left. Hold elevating slide in place. |
| (13J) | 1 | Elevating handwheel | Left end of elevating shaft | C. I. and S. | Composed for C. I. hub with steel rim and spokes. |
| (13E) | 1 | Elevating handwheel, slow motion | Sighting platform | Bz. No. 1. | |
| (14EA1) | 1 | Elevating handwheel shaft, slow motion. | do | F. S. No. 1. | |
| (14F) | 1 | Elevating handwheel shaft gear, slow motion. | Upper end of elevating connecting shaft | Bz. No. 1. | 56 teeth. |
| (14Y) | 1 | Elevating handwheel shaft-gear cover, slow motion. | Surrounds gear 14F and pinion 14G | C. I. | In halves. |
| (14G) | 1 | Elevating handwheel shaft pinion, slow motion. | Forward end of slow-motion elevating handwheel shaft. | F. S. No. 2. | 16 teeth. |
| (12H) | 1 | Elevating pin | Lower end of elevating arm | F. S. No. 3. | Secured to elevating arm by set screw 12D. |
| (15E) | 1 | Elevation scale | Riveted to slide 15A | G. S. | Graduated to least reading of 3 minutes. |
| (13A) | 1 | Elevating shaft | Rear of carriage | F. S. No. 1. | Rests in bearings in left chassis and rear transom. |
| (17E) | 1 | Elevating shaft gear | At upper end of elevating screw | C. I. No. 1. | 27 teeth. |
| (17F) | 1 | Elevating shaft pinion | do | F. S. No. 2. | Keyed to elevating shaft, 20 teeth. |
| (H12D) | 1 | Elevating slide | In guide ways of rear transom | C. S. No. 2. | Supports lower end of elevating arm. |

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|---|---|---|---|---|---|
| (H12H) | 1 | Elevating slide nut | Under elevating slide and surrounding elevating screw. | Bz. No. 4. | 10 inches long, threaded singly, 0.675-inch pitch. |
| (H12N) | 1 | Elevating slide stop | At upper end of right guideway of rear transom. | F. S. | To limit depression of gun to 0 or 2 degrees 30 minutes, depending upon its position. |
| (H12A) | 1 | Elevating screw | At rear transom | F. S. No. 3. | 54.5 inches long, 2.25 inches in diameter; threaded 39 inches. |
| (8C) | 1 | Elevating screw support | Lower end of elevating screw | C. S. No. 1. | Bolted to rear transom. |
| (H139) | 1 | Equalizing bar | Above counterbalance weight | F. S. | Weight attached to middle and rope attached to extremities. |
| | 2 | Fillers | Above safety latches in crosshead | S. | Limit the rotation of safety-latch pawls outward. |
| | 1 | Filler plate | Underneath sighting platform | S. | |
| (10EA) | 2 | Followers | Upper and lower stuffing boxes of recoil cylinder. | Bz. No. 4. | Turned by spanner wrench. |
| (H13D) | 1 | Fork, equalizing bar | In counterbalance weight | F. S. | Serves to connect weight to equalizing bar (H13N). |
| (9A1 and 9B1) | 2 | Frames, guide | Bolted to underside of chassis opposite counterweight. | C. I. No. 2. | 1 right, 1 left; 78 inches long. |
| | 2 | Gaskets | Upper and lower cylinder heads | C. | 7.75 inches outside diameter, 7.25 inches inside diameter, 0.062 inch thick. |
| (H6A) | 36 | Gears | On ends of flanged recoil rollers | F. S. No. 3. | To prevent skidding of top carriage. |
| (10J1) | 2 | Glands | Upper and lower cylinder heads of recoil cylinder. | F. S. No. 3. | Sawed in halves; engaging over followers (10EA). |
| (27J and 27K) | 2 | Guide clips | Bolted to crosshead | F. S. No. 1. | 1 right, 1 left; engaging vertical guides; contain rack for retraction. |
| (13C) | 1 | Guide bracket, right | Bolted to right chassis and to upper end of right vertical guide. | C. S. No. 1. | |
| (9C and 9D) | 2 | Guides, vertical | Bolted to inside of chassis in guide frames | F. S. No. 2. | 1 right, 1 left. |
| (H9A and H9B) | 2 | Gun levers | Support gun and rest in top carriage | C. S. No. 1. | Do. |
| (H9H) | 1 | Gun-lever axle | Rests in bearings in top carriage | F. S. No. 3. | |
| (27Y) | 2 | Gun-lever pins | Secure crosshead to lower ends of gun levers. | F. S. No. 2. | |
| (H9J) | 1 | Gun-lever yoke | Bolted to upper ends of gun levers | C. S. No. 1. | |
| (10NA) | 1 | Gutter, oil | Bolted to piston-rod beam | Br. | Under drain plug (10JA1). |
| (10AA) | 1 | Hasp | At recoil valve | S. | Secures locking disk (10K1). |
| (7C) | 3 | Hooks, crank handle | On chassis | F. S. | For hanging cranks. |
| (15J and 15K) | 2 | Index plates | Cover of elevation and range scales | G. S. | Marked O. |
| (23W and 23AA) | 3 | Instruction plates, filling plug | One on crosshead; one on each buffer cylinder. | Bz. | 1 flat, 2 curved. |
| | 4 | Keys | Chassis to racer | S. | 1 by 1.5 by 8 inches. |
| | 2 | do | Elevating shaft (13A) | S. | Riveted in place; for elevating clutch (14S); 0.375 inch square. |
| | 2 | do | do | S. | For elevating handwheel (13J) and for elevating pinion (17F); 0.375 inch square. |
| | 1 | Key | Slow motion elevating handwheel shaft (14EA1). | S. | For pinion (14G); 0.25 inch square. |
| | 2 | Keys | Elevating connecting shaft (14CA) | S. | For gears; 0.312 inch square. |
| | 2 | do | Traversing crank shaft (16J2) | S. | For traversing clutch (16AA1); 0.437 inch square. |
| | 1 | Key, gib | do | S. | For pinion (17B); 0.437 inch square. |
| | 2 | Keys | Traversing intermediate shaft (16E1) | S. | 0.312 inch square; one long, one short. |
| | 1 | Key | Traversing handwheel shaft (16A1) | S. | 0.25 inch square; for pinion (17G1). |

*Names of parts of 6-inch disappearing carriage, L. F., model of 1905, their piece marks, location, and material of which they are made*—Continued.

CARRIAGE PROPER—Continued.

| Piece mark. | Number. | Name of part. | Location. | Material. | Remarks. |
|---|---|---|---|---|---|
| (23W and 23AA) | 2 | Keys | Traversing pinion shaft (16L) | S. | For gears; 0.437 inch square; one long, one short. |
|  | 2 | Keys, gib | Retracting intermediate shaft (29V) | S. | For gears; 0.375 by 0.625 inch. |
| (27V) | 2 | Keys | Crosshead | F. S. | For gun lever pins (27Y). |
|  | 1 | Key | Staked in retracting crank shaft pinion (29AA). | S. | For ratchet wheel (29Z); 0.5 by 0.375 by 1.5 inches. |
|  | 1 | do | Staked in retracting pawl shaft (29Q) | S. | 0.25 inch square; for retracting pawls (29S) and (29T). |
|  | 2 | Keys, gib | Retracting crank shaft (29X) | S. | For retracting crank shaft pinion; 0.187 by 0.5 inch. |
|  | 4 | do | Retracting bevel gears (29L) | S. | 0.625 inch square. |
|  | 2 | Keys | Retracting bevel pinions (29M) | S. | 0.625 by 0.375 inch; staked in pinions. |
|  | 2 | Keys, gib | Tripping lever shaft (32B) | S. | For tripping rod cranks (32V); 0.5 inch square. |
|  | 2 | Keys | Retracting clutch lever pins (32A) | S. | 0.25 by 0.37 by 1 inch, staked in; to prevent rotation of pins. |
|  | 1 | Key | Tripping lever shaft (32B) | S. | 0.5 inch square, staked in; for tripping lever (32R). |
|  | 1 | do | Safety latch shaft (32E) | S. | 0.375 inch square, staked in; for safety latch handle (32Q). |
|  | 2 | Keys, gib | do | S. | 0.375 inch square; for safety latches. |
|  | 1 | Key | Elevating screw (H12A) | S. | 0.375 inch square. |
| (21H) | 2 | Ladder braces | Bolted to sighting platform and to ladder | S. |  |
| (10FA) | 1 | Liner | Lower cylinder head | Bz. No. 4. | For female part of counter-recoil buffer. |
| (H12B and H12C) | 2 | Liners | Flanges of elevating slide | Bz. No. 2. |  |
| (10K1) | 1 | Locking disk | Above counterweight | F. S. No. 1. | For regulating the setting of the recoil valve. |
|  | 1 | Name plate No. 1 | Left side of top carriage | Bz. |  |
| (10R) | 1 | Nut | Lower end of piston rod | F. S. No. 3. | Above piston rod beam. Secured by taper pin. |
| (10S) | 1 | do | do | F. S. No. 3. | Below piston rod beam. Secured by split pin. |
| (H12K) | 1 | Nut, spring compressing | Bottom of elevating slide | F. S. No. 3. | For giving elevating slide spring initial compression. |
| (H12M) | 1 | Nut | Elevating slide stop | S. | For securing the stop. |
| (H13C) | 1 | do | Under counterbalance weight | S. | On lower end of equalizing bar fork. |
| (13D) | 1 | do | Left extremity of elevating shaft (13A) | S. |  |
| (14DA) | 1 | do | Forward end of slow motion elevating handwheel shaft (14EA1). | S. |  |
| (14A) | 1 | do | Elevating clutch shifter rod, right extremity. | S. |  |
| (14AA) | 3 | Nuts | 1 at rear end of slow motion elevating handwheel shaft (14EA1), and 2 on elevating connecting shaft (14CA). | S. |  |

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|---|---|---|---|---|---|
| (16B) | | do | Traversing handwheel shaft, rear end (16A1), and traversing intermediate shaft (16E1). | S. | |
| (16F) | 1 | Nut | Traversing handwheel shaft (16A1) and traversing intermediate shaft (16E1), upper end. | S. | |
| (16M) | 2 | Nuts | Traversing pinion shaft (16L) | S. | |
| (16C) | 1 | Nut | Traversing handwheel shaft (16A1), forward end. | S. | |
| (20F) | 2 | Nuts | Sight arm bracket pins (20E) | S. | |
| | 2 | do | Third round of sighting platform ladder (21M). | S. | |
| (27U) | 8 | do | Suspension rods | S. | |
| | 1 | Padlock, Yale standard, No. 853 | Recoil valve | | To prevent unauthorized changes of setting. |
| (32U) | 2 | Pawl fulcrums | Crosshead | F. S. | For safety latch pawls of tripping gear. |
| | 52 | Pins | Rack-retaining screws (6D) | S. | |
| | 32 | do | Rack-retaining screws (H6E) | | |
| | 2 | do | For bushing (6J) | Bz. | |
| | 2 | do | Bushing (6F) | Bz. | |
| | 2 | do | Bushing (7H) | Bz. | |
| | 2 | do | Bushing (7G) | Bz. | |
| | 2 | do | Bushing (7F) | Bz. | |
| | 1 | Pin | Bushing (8D) | Bz. | |
| | 2 | Pins | Bushing (8J) | Bz. | |
| | 2 | do | Recoil valve | Bz. | For fastening body to stem. |
| | 4 | do | Piston liner recoil system | Bz. | |
| (12K) | 1 | Pin | Hinge of elevating band | S. | |
| | 8 | Pins | Bushings (12L) | Bz. | |
| | 1 | Pin | Bushing (14V1) | Bz. | |
| | 1 | do | Shifter rod (14C) | S. | |
| | 4 | Pins | Collar (14E) | Bz. | |
| | 1 | P.in | Pointer lid hinge (15R) | S. | For hinge pivot. |
| | 2 | Pins | Bushing (17R) | Bz. | |
| | 1 | Pin | Bushing (18E) | Bz. | |
| | 7 | Pins, 0.25 rivet | Railing post feet | S. | |
| | 2 | Pins | Bushings (22K) | Bz. | |
| | 32 | do | Clip bolts and nuts (27W and 27X) | S. | |
| (29H) | 12 | do | Retracting clutches | S. | Serve as plungers of retracting clutch springs (29A). |
| | 8 | do | Bushings(29D) | Bz. | |
| | 4 | do | Bushing (29U) | Bz. | |
| | 24 | do | Bushings (30H and 30J) | Bz. | |
| (30L) | 4 | do | Retracting clutch covers | S. | |
| | 2 | do | Rope clamps (H12F and H12G) | S. | In elevating slide nut. |
| | 2 | do | Crosshead | S. | For filler of safety latch pawls (32T). |
| | 72 | do | Bushings (H6C) | S. | |
| | 72 | do | Gears (H6A) | S. | |
| | 8 | do | Bushings (H12E) | Bz. | |
| | 1 | Pin | Stop (H12N) | S. | |
| (H13Q) | 2 | Pins, rope socket | Counterbalance device | F. S. | |
| | 20 | Pins | Rope of counterbalance device (H13R) | S. | For securing ends of rope to clevises. |
| | 4 | do | Bushings (H13G) | Bz. | |

*Names of parts of 6-inch disappearing carriage, L. F., model of 1905, their piece marks, location, and material of which they are made*—Continued.

CARRIAGE PROPER—Continued.

| Piece mark. | Number. | Name of part. | Location. | Material. | Remarks. |
|---|---|---|---|---|---|
| (H13P) | 1 | Pin, equalizing bar | Counterbalance device | F. S. | |
| | 2 | Pinch-bar supports | Right side of carriage | F. S. | |
| | 2 | Pinch-bar hooks | Left edge of sighting platform | F. S. | |
| (10B1) | 1 | Piston and rod | In recoil cylinder | F. S. No. 3. | Made in two parts permanently connected. |
| (10Q1) | 1 | Piston liner | Recoil piston and rod (10B1) | Bz. No. 4. | |
| (9N) | 1 | Piston-rod bracket | Bolted to front transom | C. S. No. 1. | For support of upper end of piston rod (10B1). |
| (9M) | 1 | Piston-rod beam | Bolted to lower ends of guide frames (9A1) and (9B1). | C. S. No. 2. | Piston rod is secured to its middle. |
| (19L) | 1 | Pipe, oil | Traversing handwheel shaft gear cover (19S1). | Bz. | |
| | 1 | Plate | Left side of sighting platform near the front | S. | For telautograph; 0.25 by 3.5 by 2.75 inches. |
| | 10 | Plates | Upper surface of racer | C. I. | For closing core holes of racer; cast in place with lead. |
| (H4H) | 4 | Plates, fish | Outer dust guard (H4D) | S. | For joining sections of dust guard. |
| (20K) | 2 | Plates, racer cover | Bolted to upper surface of racer | S. | For closing openings for removing traversing roller. |
| (20R1) | 1 | Plate, racer, left | Between racer and left chassis | S. | Bolted to racer. |
| (20S2) | 1 | Plate, racer, right | Between racer and right chassis | S. | Do. |
| (21P) | 1 | Platform bracket | Bolted to left chassis | C. S. No. 1. | Supports rear end of sighting platform. |
| (30B) | 2 | Plugs | Retracting intermediate shaft brackets (30P and 30Q). | Bz. | For closing outer ends of bearings. |
| (10JA1) | 1 | Plug, drain | Lower cylinder head (10X1) | F. S. No. 3. | |
| (15P) | 1 | Pointer lid | Elevation and range scale and pointer | Bz. | |
| (15R) | 1 | Pointer-lid hinge | do | Bz. | |
| (5A1) | 1 | Racer | On traversing rollers | C. I. No. 2. | |
| (5B) | 1 | Racer liner | Pintle surface of racer | Bz. | In four sections. |
| (H6G and H6H) | 4 | Racks | On each side of roller paths of top carriage | F. S. No. 3. | 2 right, 2 left. |
| (6B and 6C) | 4 | do | On each side of roller paths of chassis | F. S. No. 3. | Do. |
| (H6E) | 32 | Rack-retaining screws | Racks of top carriage | S. | Forced and pinned in place with outer end twisted off and finished flush. |
| (6D) | 52 | do | Racks of chassis | S. | Do. |
| | 7 | Railings | Sighting platform | W. I. | Of piping 1 inch inside diameter. |
| | 7 | Railing posts | do | W. I. | Do. |
| | 3 | Railing-post extensions | do | W. I. | Do. |
| (21T) | 7 | Railing-post feet | do | C. S. | |
| (15D) | 1 | Range scale | Riveted to slide (15A) | G. S. | |
| (10A1) | 1 | Recoil cylinder | In counterweight | F. S. No. 3. | 7.25-inch bore, 10.5 inches outside diameter, 61 inches long; two throttling grooves. |
| (19Q and 19R) | 2 | Recoil indicator scales | Bolted to inside of both chassis opposite opening at forward end. | Bz. | 1 right, 1 left. Numbered graduations cast 1 inch apart from 32 to 52, inclusive. |

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|---|---|---|---|---|---|
| (19H) | 2 | Recoil indicator pointers | Attached to front face of guide clips (27J) and (27K). | Bz. | |
| (10P) | 1 | Recoil valve body | Inside of piston rod at piston | Bz. No. 4. | 8 inches long, 1.5 inches in diameter, with slot 0.4 inch wide by 1.625 inches long. |
| (10N) | 1 | Recoil valve stem | Inside of upper half of piston rod | S. | 63.75 inches long. |
| (29L) | 2 | Retracting bevel gears | At rear ends of retracting clutch shafts (29J). | C. S. No. 3. | 64 teeth. |
| (29M) | 2 | Retracting bevel pinions | At extremities of retracting intermediate shaft (29V). | F. S. No. C. | 13 teeth. |
| (29E and 29F) | 2 | Retracting clutches | Surround retracting clutch sleeves (29G), keyed to them. | F. S. No. C. | 1 right, 1 left; 48 clutch teeth on forward end, with an outside diameter of 13 inches. |
| (30F and 30G) | 2 | Retracting clutch covers (outside) | Surround retracting clutches | C. S. No. 2. | 1 right, 1 left. |
| (30D and 30E) | 2 | Retracting clutch covers (inside) | do | C. S. No. 2. | Do. |
| (32G and 32H) | 2 | Retracting clutch levers | Pivoted above retracting clutches (29E and 29F), surrounding them, and extending 30.5 inches below them. | F. S. No. 2. | Do. |
| (32A) | 2 | Retracting clutch lever pins | At pivot of retracting clutch levers (32G and 32H). | Bz. | |
| (32D) | 4 | Retracting clutch lever studs | In retracting clutch levers (32G and 32H) engaging groove in retracting clutches (29E and 29F). | F. S. | |
| (29B and 29C) | 2 | Retracting clutch pinions | Engage in racks of guide clips (27J and 27K). | F. S. No. C. | Do. |
| (29J) | 2 | Retracting clutch shafts | In three bearings in chassis parallel to them. | F. S. No. C. | |
| (30Y) | 2 | Retracting clutch shaft plugs | In front of retracting clutch shaft (29J) | Bz. | |
| (29G) | 2 | Retracting clutch sleeves | On retracting clutch shafts in rear of retracting clutch pinions (29B and 29C). | F. S. No. 2. | Fixed to shaft by 12 feathers. |
| (29E) | 12 | Retracting clutch springs | In retracting clutches (29E and 29F) | S. | Act against flange on rear of retracting clutch sleeves (29G). |
| (29Y) | 2 | Retracting cranks | At extremities of retracting crank shaft (29X). | F. S. No. 2. | Leverage 14 inches; handle 17 inches long. |
| (29X) | 1 | Retracting crank shaft | Extends through chassis at about the center of carriage. | F. S. No. 2. | 125.5 inches long, 2 inches in diameter, with squared extremities. |
| (30A) | 2 | Retracting crank shaft brackets | Support retracting crank shaft (29X) outside of chassis. | C. I. No. 2. | |
| (29AA) | 2 | Retracting crank shaft pinions | On retracting crank shaft inside of chassis | F. S. No. 3. | 13 teeth. |
| (29N) | 2 | Retracting intermediate gears | On retracting intermediate shaft (29B) inside of retracting bevel pinion (29M). | C. S. No. 2. | 122 teeth. |
| (29V) | 1 | Retracting intermediate shaft | Between chassis in rear of center of carriage. | F. S. No. 2. | 48.75 inches long, 2.125 inches in diameter. |
| (30P and 30Q) | 2 | Retracting intermediate shaft brackets | Bolted to inside of chassis | C. S. No. 2. | 1 right, 1 left. |
| (29R) | 1 | Retracting pawl lever | Outside of left chassis at extremity of pawl shaft (29Q). | F. S. No. 2. | |
| (29Q) | 1 | Retracting pawl shaft | Seated in left chassis 4.5 inches in rear of center of carriage. | F. S. No .3. | 11.625 inches long, 1.625 inches diameter. |
| (29S and 29T) | 2 | Retracting pawls | Inside of chassis at extremity of retracting pawl shaft (29Q). | F. S. No. 2. | 1 inside, 1 outside; pinned and keyed to shaft. |
| (29P) | 1 | Retracting pawl stud | Above retracting pawls (29S and 29T) | F. S. No. 2. | To limit upward motion of pawls. |
| (29Z) | 1 | Retracting ratchet wheel | On retracting crank shaft inside of left chassis. | C. S. No. 2. | 50 teeth. |
| (16W1) | 3 | Retracting and traversing crank retaining catches. | Inside of hubs of retracting and traversing cranks. | S. | |

*Names of parts of 6-inch disappearing carriage, L. F., model of 1905, their piece marks, location, and material of which they are made*—Continued.

CARRIAGE PROPER—Continued.

| Piece mark. | Number. | Name of part. | Location. | Material. | Remarks. |
|---|---|---|---|---|---|
| (10GA) | 2 | Rings, wire spring | Around glands of recoil cylinder stuffing boxes. | S. | To hold halves of gland together. |
|  | 1 | Rivet | Hinge pivot of hasp (10AA) | S. |  |
|  | 2 | Rivets | Elevating shaft (13A) | S. | For securing key. |
|  | 2 | do | Traversing crank shaft (16J2) | S. | For securing keys. |
|  | 4 | do | Traversing clutch rod (18N1) | S. | For securing clutch rod ends (18S). |
|  | 4 | do | Pinch bar supports on sighting platform | S. |  |
|  | 2 | do | Telautograph plate on sighting platform | S. |  |
|  | 75 | Rivets, 0.375 inch | Sighting platform | S. |  |
|  | 12 | Rivets | Bottom plate liners (27A) | Bz. |  |
|  | 32 | do | Crosshead liners (27S) and (27T) | Bz. |  |
|  | 14 | do | Liners (H12B and H12D) to elevating slide (H12C). | Br. |  |
|  | 8 | Rivets, 0.375 inch | Fish plates (H4H) to outer dust guard (H4D) | S. |  |
| (H6F) | 18 | Rollers, recoil | Between top carriage and chassis | F. S. No. 3. | Unflanged; 4.5 inches long by 3.429 inches in diameter. |
| (H6D) | 18 | do | do | F. S. No. 3. | Flanged; 4.1 inches between flanges and 3.429 inches in diameter. |
| (H6K) | 36 | Roller axles | In recoil rollers (H6D and H6F) | F. S. No. 3. | 8.312 inches long. |
| (H6V) | 36 | Roller-axle nuts | At outside end of roller axles (H6K) | S. |  |
| (H6N and H6P) | 4 | Roller-cage side frames | Ends of roller axles (H6K) | F. S. No. 2. | 2 inside, 2 outside. |
| (H12F and H12G) | 2 | Rope clamps | Bolted to elevating slide nut (H12H) | S. | 1 right, 1 left; to secure rope of counterbalance device. |
| (23A) | 2 | Roller bearings | Elevating gear | S. | Diameter of shaft, 1.5 inches. |
| (23B) | 5 | do | Elevating and traversing gear | S. | Diameter of shaft, 1.75 inches. |
| (23C) | 4 | do | Traversing gear | S. | Diameter of shaft, 2 inches. |
| (23D) | 6 | do | Retracting gear | S. | Diameter of shaft, 2 inches, without sleeve on shaft. |
| (23E) | 2 | do | Traversing gear | S. | Diameter of shaft, 2.125 inches. |
| (23F) | 6 | do | Retracting gear | S. | Diameter of shaft, 3.125 inches, without sleeve on shaft. |
| (32J) and (32K) | 2 | Safety latches | Pivoted inside of chassis | F. S. No. 2. | Engage lugs on retracting clutch levers (32G) and (32H). |
| (32Q) | 1 | Safety-latch handle | Outside of left chassis, near the bottom | F. S. | For purpose of raising the safety latches. |
| (32S) | 2 | Safety-latch pawl springs | Behind safety-latch pawls (32T) | S. |  |
| (32T) | 2 | Safety-latch pawls | Rear and outside of crosshead | Bz. | Engage forward end of safety latches (32J) and (32K). |
| (32E) | 1 | Safety-latch shaft | Extends between the chassis 9.228 inches in rear of the center. | F. S. | 76.5 inches long, 1.496 inches in diameter. |
|  | 3 | Screws, spring catch | Retaining catches (16W1) | S. |  |
| (25P) | 2 | Separators | Left chassis | C. I. | For tap bolts securing outlet box. |

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|---|---|---|---|---|---|
| (H13K) | 2 | Sheaves, lower guide | Counterbalance device | C. I. No. 1. | 9.5 inches outside diameter. |
| (H13J) | 2 | Sheaves, upper guide | Rear transom | C. I. No. 1. | 9.5 inches outside diameter, for counterbalance device. |
| (22F) | 1 | Shoulder rest | Sighting platform | C. I. No. 1. | Bolted to shoulder-rest bracket (22B) |
| (22B) | 1 | Shoulder-rest bracket | .....do | C. I. No. 1. | Bolted to sight standard. |
| (20E) | 2 | Sight-arm bracket pins | In sight-arm bracket (20D) | S. | For supporting sight arm. |
| (21B2) | 1 | Sighting platform floor | Sighting platform | S. | |
| (21M) | 1 | Sighting platform ladder | Rear of sighting platform | S. | 2 sides and 4 rounds. |
| (20B1) | 1 | Sight standard | Bolted to left chassis near front | C. S. No. 2. | Supports sight and forward end of sighting platform. |
| (13G) | 2 | Sleeves | For elevating handwheel (13J) and slow-motion elevating handwheel (13E). | Bz. | |
| (16S) | 1 | Sleeve | Traversing handwheel (16R) | Bz. | |
| (13C) | 1 | .....do | On elevating shaft (13A) | Bz. | Inside of elevating connecting-shaft gear (14L). |
| (15A) | 1 | Slide | Elevation and range scale | Bz. No. 2. | Carries elevation and range scales; 28.875 inches long. |
| | 2 | Split pins | Rear transom | S. | For studs (8M). |
| | 1 | Split pin | Lower end of piston rod | S. | For nut (10S). |
| | 1 | .....do | .....do | S. | For taper pin of nut (10R). |
| | 1 | .....do | Elevating band | S. | For pin (12K). |
| | 2 | Split pins | .....do | S. | For taper pins securing band trunnions (12C). |
| | 2 | .....do | .....do | S. | For nuts of bolts (12J). |
| | 5 | .....do | Elevating shaft (13A) | S. | For taper pins of collars (13B) and gear (14L). |
| | 1 | Split pin | .....do | S. | For nut (13D) on left end of shaft. |
| | 1 | .....do | Elevating connecting shaft bearing (upper) (14X). | S. | For securing elevating clutch fork pivot (14Q). |
| | 2 | Split pins | Elevating connecting shaft (14CA) | S. | For taper pins of collars (14BA). |
| | 1 | Split pin | Slow-motion elevating handwheel shaft (14EA1). | S. | For nut securing gear. |
| | 2 | Split pins | Elevating connecting shaft (14CA) | S. | For nuts at ends of shaft. |
| | 1 | Split pin | Elevating clutch shifter rod (14C) | S. | For nut (14A) securing shifter (14B). |
| | 1 | .....do | slow motion elevating handwheel shaft (14EA1). | S. | For nut securing handwheel. |
| | 1 | .....do | Traversing handwheel shaft (16A1) | S. | For taper pin of collar (16D). |
| | 2 | Split pins | Traversing intermediate shaft (16E1) | S. | For taper pins of collars (16G) and (16H). |
| | 1 | Split pin | .....do | S. | For nut (16B) securing gear at lower end. |
| | 2 | Split pins | Traversing pinion shaft (16L) | S. | For nuts (16M) at extremities. |
| | 1 | Split pin | Traversing handwheel shaft (16A1) | S. | For nut (16C) securing gear. |
| | 1 | .....do | Traversing intermediate shaft (16E1) | S. | For nut (16F) securing gear at upper end. |
| | 1 | .....do | .....do | S. | For nut securing gear at lower end. |
| | 7 | Split pins | Traversing crank shaft (16J2) | S. | For taper pins securing gear and collars. |
| | 1 | Split pin | Traversing clutch fork (18U1) | S. | For taper pin securing traversing clutch lever (18V1). |
| | 1 | .....do | Traversing clutch plunger | S. | For securing taper pin securing foot piece (18P). |
| | 3 | Split pins | Clutch rod pins (18T) | S. | |
| | 2 | .....do | Traversing clutch shaft (18CA) | S. | For securing taper pins. |
| | 2 | .....do | Sight-arm bracket pins (20E) | S. | For securing nuts (20F). |
| | 8 | .....do | Suspension rods (27R) | S. | For securing nuts (27U). |
| | 2 | .....do | Retracting crank shaft (29Y) | S. | For taper pins of collars (29W). |
| | 1 | Split pin | Retracting pawl lever (29R) | S. | For securing taper pin of lever, |

*Names of parts of 6-inch disappearing carriage, L. F., model of 1905, their piece marks, location, and material of which they are made*—Continued.

CARRIAGE PROPER—Continued.

| Piece mark. | Number. | Name of part. | Location. | Material. | Remarks. |
|---|---|---|---|---|---|
| (15A) | 2 | Split pins | Retracting clutch shafts (29J) | S. | For taper pins of collars (29K). |
|  | 2 | do | Tripping lever shaft (32B) | S. | For taper pins of collars (32C). |
|  | 2 | do | Safety latch shaft (32E) | S. | For collars (32F). |
|  | 1 | Split pin | do | S. | For securing safety latch handle (32Q). |
|  | 4 | Split pins | Tripping rod pins (32M) | S. | For securing the pins. |
|  | 1 | Split pin | Tripping lever shaft (32B) | S. | At left extremity for securing tripping lever. |
|  | 1 | do | Elevating screw (H12A) | S. | For securing taper pin. |
|  | 2 | Split pins | Retracting clutch lever pins (32A) | S. | For securing the pins. |
|  | 2 | do | Safety latches (32J) and (32K) | S. | For taper pins securing the latches. |
|  | 1 | Split pin | Elevating slide stop (H12N) | S. | For securing nut. |
|  | 1 | do | Spring compressing nut (H12K) | S. | For securing taper pins. |
|  | 2 | Split pins | Lower guide-sheave axle (H13S) | S. | Do. |
|  | 2 | do | Equalizing bar pin (H13P) | S. | For securing bar. |
|  | 1 | Split pin | Rear clip and traversing bracket (H13M) | S. | For securing taper pin in bearing of lower guide-sheave axle (H13S). |
|  | 4 | Split pins | Rope socket pins (H13Q) | S. | For securing the pins. |
|  | 1 | Split pin | Equalizing bar fork (H13D) | S. | For securing nut (H13C). |
|  | 2 | Split pins | Upper guide-sheave axle (H13T) | S. | For securing the axle. |
| (H12J) | 1 | Spring, elevating slide | Around elevating slide nut (H12H) | S. | 12.8 inches free height, 10.5 inches assembled height under 2,000 pounds. |
| (18R) | 1 | Spring stirrup | Sighting platform | Bz. | Supports traversing clutch plunger and clutch-rod spring (18W). |
|  | 10 | Staples | Counterweight | F. S. | For seventh and eighth layers. |
|  | 12 | do | do | F. S. | For first six layers. |
|  | 2 | do | do | F. S. | For bottom plate. |
| (16T) | 1 | Stem | Traversing handwheel (16R) | S. | Riveted into rim of handwheel; sleeve (16S) turns on it. |
| (13F) | 1 | do | Slow-motion elevating handwheel (16E) | S. | Riveted into rim of handwheel. |
| (15H) | 1 | do | Elevating handwheel | S. | Do. |
|  | 4 | Strips | Outer dust guard | F. |  |
|  | 4 | do | Inner dust guard | F. |  |
| (H4G) | 1 | Strip | Outer dust guard | S. | In four pieces, for securing felt. |
| (22D) | 1 | Strip, nut | Shoulder rest (22F) | Bz. | For securing rubber tubing (22C). |
| (27R) | 4 | Suspension rods | Counterweight | F. S. No. 3. | For carrying counterweight, 73.25 inches long by 3 inches diameter. |
|  | 1 | Taper pin | Lower end of recoil piston rod | S. | For nut (10R). |
|  | 1 | do | Elevating slide (H12C) | S. | For spring compressing nut (H12K). |
|  | 2 | Taper pins | Elevating band | S. | For band trunnions (12C). |
|  | 1 | Taper pin | Elevating shaft (13A) | S. | For pinion (17F). |
|  | 4 | Taper pins | do | S. | For collars (13B). |
|  | 2 | do | Elevating connecting shaft (14CA) | S. | For collars (14BA). |
|  | 1 | Taper pin | Elevating clutch shifter-rod handle (14K) | S. | For securing handle. |

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|---|---|---|---|---|---|
| | 6 | Taper pins | Traversing crank shaft (16J2) | S. | For collars (16K). |
| | 2 | .....do | Traversing intermediate shaft (16E1) | S. | For collars (16G) and (16H). |
| | 1 | Taper pin | Traversing handwheel shaft (16A1) | S. | For collar (16D). |
| | 1 | .....do | Traversing crank shaft (16J2) | S. | For pinion (17B). |
| | 2 | Taper pins | Traversing clutch shaft (18CA) | S. | At extremities of shaft. |
| | 1 | Taper pin | Traversing clutch fork (18U1) | S. | For securing traversing clutch lever (18V1). |
| | 1 | .....do | Traversing clutch plunger | S. | For securing foot piece (18P) to end (18X). |
| | 2 | Taper pins | Retracting clutch shafts (29J) | S. | For securing collars (29K). |
| | 2 | .....do | Retracting crank shaft (29X) | S. | For securing collars (29W). |
| | 1 | Taper pin | Retracting pawl lever (29R) | S. | For securing it to its shaft. |
| | 2 | Taper pins | Tripping lever shaft (32B) | S. | For securing collars (32C). |
| | 1 | Taper pin | Elevating screw (H12A) | S. | For securing gear (17E). |
| | 2 | Taper pins | Safety latches (32J) and (32K) | S. | |
| | 2 | .....do | Safety latch shaft (32E) | S. | For securing collars (32F). |
| | 1 | Taper pin | Rear clip and traversing bracket | S. | For securing lower guide-sheave axle (H13S). |
| | 2 | Taper pins | Lower guide-sheave axle (H13S) | S. | For collars (H13L). |
| | 3 | Tees | Sighting platform | M. I. | For railing. |
| (H3F) | 12 | Thrust plates | Underneath base ring | S. | To provide bearing for leveling screws. |
| (H6U) | 1 | Top carriage | On recoil rollers | C. S. No. 2. | |
| (8H) | 1 | Transom cap | Rear transom | C. S. No. 1. | Forms double thrust bearing for elevating screw. |
| (8A1) | 1 | Transom, front | Front of carriage between chassis | C. S. No. 1. | |
| (8B) | 1 | Transom, rear | Rear of carriage between chassis | C. S. No. 1. | |
| (H13M1) | 1 | Traversing bracket | Rear clip and bolted to racer and rear transom at middle of carriage. | C. S. No. 1. | Supports traversing pinion shaft (16L), traversing crank shaft (16J2), and lower guide sheave axle (H13S). |
| (16AA1) | 1 | Traversing clutch | Left end of traversing crank shaft (16J2) | F. S. No. 1. | For disengaging slow motion traversing gear. |
| (18U1) | 1 | Traversing clutch fork | Engages traversing clutch (16AA1) | F. S. | For shifting clutch. |
| (17S1) | 1 | Traversing clutch gear | Left end of traversing crank shaft (16J2) inside of clutch. | C. I. No. 1. | 64 teeth; has lugs which engage clutch; when not engaged, gear turns freely on shaft. |
| (18V1) | 1 | Traversing clutch lever | Between traversing clutch rod and traversing clutch fork (18U1). | F. S. | |
| (17T1) | 1 | Traversing clutch pinion | Lower end of traversing intermediate shaft (16E1). | F. S. | 20 teeth. |
| (18X) | 1 | Traversing clutch plunger end | Seated in spring stirrup (18R), on sighting platform. | S. | |
| (18P) | 1 | Traversing clutch plunger foot piece | Pinned to upper end of end (18X) | Bz. | |
| (18N1) | 1 | Traversing clutch rod tooth | Between traversing clutch shaft lever (18FA) and traversing clutch lever (18V1). | S. | Seamless cold drawn tubing 36.75 inches long between centers of ends (18S). |
| (18Z) | 2 | Traversing clutch shaft bearings | Bolted to underside of sighting platform | C. I. No. 1. | Support traversing clutch shaft (18CA). |
| (18FA) | 1 | Traversing clutch shaft lever | Between traversing clutch rod and traversing clutch shaft (18CA). | F. S. | 4 inches between centers. |
| (18CA) | 1 | Traversing clutch shaft | In traversing clutch shaft bearings (18Z) | F. S. | 37.5 inches long, 1 inch in diameter. |
| (16V) | 1 | Traversing crank | Right side of carriage on traversing crank shaft (16J2). | F. S. | 14 inches leverage, 12-inch handle. |
| (16J1) | 1 | Traversing crank shaft | Rests in bearings in chassis 41.6 inches in rear of center of carriage. | F. S. | 94 inches long, 2 inches diameter. |
| (17A) | 1 | Traversing crank shaft gear | Traversing pinion shaft (16L) | C. I. No. 1. | 90 teeth. |
| (19F) | 1 | Traversing crank shaft gear cover | Surrounds traversing crank gears in center of carriage. | C. I. | In halves. |
| (19D1) | 1 | Traversing intermediate shaft gear cover. | Surrounds traversing clutch gears at left extremity of traversing crank shaft (16J2). | G. I. | In halves; also contains bearing for traversing clutch fork (18U1). |

*Names of parts of 6-inch disappearing carriage, L. F., model of 1905, their piece marks, location, and material of which they are made*—Continued.

CARRIAGE PROPER—Continued.

| Piece mark. | Number. | Name of part. | Location. | Material. | Remarks. |
|---|---|---|---|---|---|
| (17B) | 1 | Traversing crank shaft pinion | Traversing crank shaft (16J2) at middle of carriage. | F. S. No. 2. | 20 teeth. |
| (16R) | 1 | Traversing handwheel | Rear end of traversing handwheel shaft (16A1), on sighting platform. | Bz. No. 1. | 15.5 inches in diameter. |
| (16A1) | 1 | Traversing handwheel shaft | In two bearings on sighting platform | F. S. No. 1. | 26.516 inches long, 1.25 inches diameter. |
| (22M) | 1 | Traversing handwheel shaft bearing | On sighting platform; bolted to shoulder rest (22B). | C. I. No. 1. | Bronze bushed. |
| (17H1) | 1 | Traversing handwheel shaft gear | At upper end of traversing intermediate shaft (16E1). | C. I. No. 1. | 70 teeth. |
| (19S1) | 1 | Traversing handwheel shaft gear cover. | Surrounds traversing handwheel shaft gears (17G1) and (17H1). | C. I. | In halves. |
| (17G1) | 1 | Traversing handwheel shaft pinion | Forward end of traversing handwheel shaft (16A1). | F. S. No. 2. | 15 teeth. |
| (16E1) | 1 | Traversing intermediate shaft | Extends from sighting platform to left extremity of traversing crank shaft (16J2). | F. S. No. 1. | 101.92 inches long, 1.75 inches diameter. |
| (18G1) | 1 | Traversing intermediate shaft bearing (upper). | Bolted to right side of sight standard, on sighting platform. | C. I. No. 1. | Has bearings for forward end of traversing handwheel shaft (16A1) and for upper end of traversing intermediate shaft (16E1). |
| (18L1) | 1 | Traversing intermediate shaft bearing (lower). | Bolted to chassis at left extremity of traversing crank shaft (16J2). | C. I. No. 1. | Has bearings for lower end of traversing intermediate shaft (16E1) and for left end of traversing crank shaft (16J2). |
| (18DA) | 1 | Traversing foot lever | From traversing clutch plunger to forward end of traversing clutch shaft (18CA). | F. S. | 6.55 inches between centers. |
| (17L) | 1 | Traversing pinion | At lower end of traversing pinion shaft (16L). | F. S. No. 3. | 20 teeth engaging in traversing rack (17K). |
| (16L) | 1 | Traversing pinion shaft | In vertical bearing in rear clip and traversing bracket (H13M). | F. S. No. 1. | 26.375 inches long, 2.125 inches diameter. |
| (17K) | 1 | Traversing rack | Inside of base ring | S. | In six sections. |
| (H4B) | 24 | Traversing rollers | In bearings in distance ring (H4A) | F. S. No. 3. | |
| (H3B) | 2 | Traversing stops | Bolted to inside of base ring above traversing rack. | S. | To limit movement of carriage in azimuth. |
| (32R) | 1 | Tripping lever | Outside of rear of left chassis | F. S. | 42 inches long. |
| (32B) | 1 | Tripping lever shaft | Rests in bearing in chassis 37.75 inches in rear of the center of the carriage. | F. S. | 72.25 inches long, 1.998 inches diameter. |
| (32P) | 1 | Tripping lever stop | Screwed into flange on rear of left chassis | F. S. | To limit upward movement of tripping lever (32R). |
| (32L) | 2 | Tripping rods | From tripping rod cranks (32V) to lower ends of retracting clutch levers (32G and 32H). | S. | 46 inches between centers, made up of two F. S. ends (32N) riveted to one cold drawn. seamless steel tube. |
| (32V) | 2 | Tripping rod cranks | Keyed to tripping lever shaft (32B) inside of chassis. | F. S. | 4 inches between centers. |

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| (32M) | 4 | Tripping-rod pins | Connecting tripping rods (32L) to cranks (32V) and retracting clutch levers (32G and 32H). | Bz. | |
| (5D) | 12 | Tubes, oil | In racer (5A1) | S. | For receiving oil plugs for lubricating pintle surface and traversing roller bearings (H4C), 1.375 inches long, 0.75 inch outside diameter. |
| (5E) | 14 | Tubes | Extending through racer to lubricate bearings (H4C). | Br. | Seamless drawn. |
| (16U) | 1 | Tube | Handle of traversing crank (16V) | Br. | 11.99 inches long, 1.375 inches outside diameter. |
| (22C) | 1 | do. | Bolted to rear end of shoulder rest (22F) | | Rubber tubing without fabric. |
| | 2 | Tubes | Handles of retracting cranks (29Y) | Br. | 16.99 inches long, 1.375 inches outside diameter. |
| (10M) | 1 | Valve stem nut | Upper end of piston rod | Bz. No. 4. | 2.187 inches long, 1.875 inches outside diameter. |
| | 1 | Washer | On handle of traversing handwheel (16R) | S. | To secure sleeve (16S). |
| | 1 | do. | Elevating band | S. | On pin (12K) forming hinge pivot of elevating band. |
| (12E and 12F) | 6 | Washers | Elevating arm (12A) | Bz. | 2 of (12E) and 4 of (12F) for lining outsides of bearings (12E) at lower end and (12F) at upper end. |
| | 1 | Washer | Slow motion elevating handwheel (13E) | S. | On stem (13F) for securing sleeve (13G). |
| | 1 | do. | Elevating handwheel (13J) | S. | On stem (13H) of handle for securing sleeve (13G). |
| | 6 | Washers | Elevating shaft | F. | For excluding dust from bearings. |
| | 6 | do. | Slow motion elevating gear | F. | In elevating connecting shaft gear cover (14Z) and in gears and collars. |
| | 6 | do. | Traversing crank shaft (16J2) | F. | For collars (16K). |
| | 2 | do. | Traversing intermediate shaft (16E1) | F. | For collars (16G and 16H). |
| | 1 | Washer | Traversing crank (16V) | S. | For securing tubing (16U). |
| (17D) | 1 | do. | Elevating shaft pinion (17F) | Bz. | |
| (17Q) | 1 | do. | Traversing clutch pinion (17T1) | Bz. | |
| | 1 | do. | Traversing pinion (17L) | F. | |
| | 1 | do. | Traversing clutch pinion (17T1) | F. | For washer (17Q). |
| | 1 | do. | Traversing crank shaft gear (17A) | F. | |
| (17C) | 1 | do. | Traversing crank shaft pinion (17B) | Bz. | |
| | 1 | do. | do. | F. | For washer (17C). |
| | 1 | do. | Traversing clutch gear (17S1) | F. | |
| | 1 | do. | Elevating shaft pinion (17F) | F. | For washer (17D). |
| | 2 | Washers | Retracting cranks (29Y) | S. | For securing brass tube. |
| | 5 | do. | Retracting clutch shafts (29J) and retracting crank shafts (29X). | F. | In collars. |
| (H4F) | 4 | do. | Outer dust guard (H4D) | S. | For bolts (H4L) securing clamps (H4E). |
| (H9F) | 4 | do. | Lower ends of gun levers | Bz. | For facing bearings, 14 inches outside diameter and 9 inches inside diameter. |
| (H12L) | 1 | Washer | Elevating slide stop (H12N) | S. | |
| (H13E) | 1 | Weight | Counterbalance device | C. I. | Weight 580 pounds, 20 inches high, 12 inches in diameter. |
| (H13R) | 1 | Wire rope | do. | C. S. | 180 inches between centers, 0.375 inch diameter. |

*Names of parts of 6-inch disappearing carriage, L. F., model of 1905, their piece marks, location, and material of which they are made*—Continued.

COUNTER RECOIL SYSTEM.

| Piece mark. | Number. | Name of part. | Location. | Material. | Remarks. |
|---|---|---|---|---|---|
| (H7L and H7M) | 2 | Buffer cylinders | Forward ends of roller paths of chassis | C. S. No. 1. | 1 right, 1 left. |
| (H7D2) | 4 | Buffer followers | Buffer stuffing boxes (H7C) | F. S. No. 2. | Turned by spanner wrench applied directly to them. |
| (47Z) | 4 | Buffer glands | Inside of followers | | |
| (H7H) | 2 | Buffer pistons and rods | In bore of buffer cylinders (H7L and H7M) | F. S. No. 3. | 38 inches long, 1.748 inches diameter. |
| (H7J) | 2 | Buffer piston liners | Around buffer piston heads | Bz. No. 3. | 1.75 inches thick, 3.498 inches diameter. |
| (H7K) | 4 | Buffer springs | On each side of buffer cylinders (H7L and H7M). | S. | 25 inches free height, 3.375 inches inside diameter, 18.125 inches long, assembled under 230 pounds. |
| (H7B) | 4 | Buffer spring covers | Surrounding buffer springs (H7K) | | Seamless drawn brass tubing 18.95 inches long. |
| (H7A) | 4 | Buffer spring rings | Inside of buffer spring covers (H7B) at forward end. | S. | Provide a seat for buffer spring. |
| (H7E) | 4 | Buffer spring rods | Inside of buffer springs (H7K), extending 8.375 inches to the front of the buffer cylinders. | F. S. No. 2. | 28.95 inches long, 0.875 inch diameter. |
| (H7F) | 4 | Buffer spring supports | Rear ends of buffer spring rods (H7E) | F. S. No. 2. | Support rear ends of springs and are used in assembling them. |
| (H7C) | 4 | Buffer stuffing boxes | Close ends of buffer cylinders (H7L) and (H7M). | Bz. No. 3. | |
| (H7G) | 2 | Buffer yokes | Connected to front ends of buffer spring rods (H7E) and to buffer pistons (H7H). | C. S. No. 1. | 11.5 inches between centers. |
| (H7K) | 2 | Clamps | Inside of front transom | S. | For holding equalizing and throttling pipes in place. |
| (H7V) | 2 | do | Bolted to rear side of flange on top of front transom. | S. | Do. |
| | 8 | Collars | Pipe connections | C. | 1.48 inches outside diameter and 0.765 inch inside diameter. |
| (H8D) | 4 | Couplings | Equalizing and throttling pipes to buffer valve. | F. S. No. 1. | |
| (H8C) | 1 | Disk | Buffer valve | Bz. No. 2. | Graduated to indicate setting of valve. |
| (H8J) | 1 | Emptying plug | do | F. S. No. 1. | At bottom of valve for emptying counter recoil system. |
| (H7S and H7T) | 4 | Equalizing and throttling pipes | Join buffer cylinders (H7L and H7M) to buffer valve. | C. | 2 of each—(H7S) 54 inches long approximately (H7T), 50 inches long approximately. |
| (H8E) | 4 | Followers | Equalizing and throttling pipes to buffer cylinder. | Bz. No. 4. | |
| | 4 | Gaskets | For buffer stuffing boxes (H7C) | C. | |
| (H8K) | 1 | Gland | Around valve stem (H8B) | Bz. | Hexagonal nut on exterior. |
| | 1 | Padlock, Yale standard, No. 853 | Through hole in valve stem (H8B) | | To prevent change in setting of buffer valve. |
| | 2 | Pins | Buffer piston liners (H7J) to buffer pistons (H7H). | Bz. | Riveted. |
| | 1 | Pin | Disk (H8C) | Bz. | To limit movement of valve handle (H8A) to 360 degrees. |

| | | | | | |
|---|---|---|---|---|---|
| | 8 | Rings | Equalizing and throttling pipes | S. | For pipe connections. |
| | 2 | Screw pins | Disk (H8C) | S. | For holding disk in place. |
| | 2 | Split pins | Buffer yokes (H7G) to buffer piston and rods (H7H). | S. | To secure taper pin. |
| | 4 | ....do | Buffer yokes (H7G) to buffer spring rods (H7E). | S. | To secure taper pins. |
| | 4 | ....do | Buffer spring supports (H7F) | S. | Do. |
| | 1 | Split pin | Valve stem (H8B) | S. | To prevent removal of handle. |
| | 4 | Taper pins | Buffer spring supports (H7F) | S. | |
| | 2 | ....do | Buffer yokes (H7G) to buffer piston (H7H). | | |
| | 4 | ....do | Buffer yokes (H7G) to buffer spring rods (H7E). | | |
| (H8A) | 1 | Valve handle | Buffer valve | Bz. No. 2. | For turning valve stem (H8B). |
| (H8L) | 1 | Valve seat | ....do | F. S. No. 2. | Has conical seat on which point of valve stem (H8B) seats. |
| (H8F) | 1 | Valve body | Bolted to top of opening in front transom | Bz. No. 4. | |
| (H8B) | 1 | Valve stem | Seated in valve body (H8F) | | Consisting of 1 shank, Bz. No. 4; 1 tap, F. S. No. 1; 2 rivets, Bz. |
| (H8H) | 1 | Washer | Stuffing boxes of buffer valve | S. | 1.5 inches outside diameter, 1 inch inside diameter. |
| | 8 | Washers | Pipe connections | V. F. | |

## AZIMUTH POINTER.

| | | | | | |
|---|---|---|---|---|---|
| (H5P) | 1 | Azimuth circle | Screwed to top of base ring | Br. | In six sections, with numbered graduations at intervals of 1 degree. |
| (H5C) | 1 | Azimuth pointer body | In opening in upper surface of racer on right side of carriage. | Bz. | Bolted and doweled to racer, dowels to be inserted after carriage is oriented. |
| (H5J) | 1 | Collar | On screw (H5K) | Bz. | Graduated from 0 to 9, inclusive. |
| | 1 | Dowel | For scale (H5D) | G. S. | |
| | 2 | Dowels | Permanently locate azimuth pointer body (H5C). | Bz. | |
| (H5G) | 1 | Hinge | Lid (H5F) | Bz. | Secured to racer by 3 countersunk screws (H5H). |
| | 1 | Hinge pin | Joins hinge and lid | S. | Riveted. |
| (H5A) | 1 | Index | Attached to slide (H5R) | G. S. | Secured to nut (H5E). |
| | 2 | Index marks | Azimuth pointer body (H5C) | G. S. | Soldered on each end of body for micrometer graduations of screw (H5K). |
| (H5F) | 1 | Lid | Covers azimuth pointer | Bz. | |
| (H5E) | 1 | Nut | One screw (H5K) | Bz. | Carries slide (H5R). |
| | 1 | Pin | Secures sleeve (H5L) | G. S. | |
| (H5D) | 1 | Scale | On lower edge of azimuth pointer body (H5C). | G. S. | Dovetailed and doweled. |
| (H5K) | 1 | Screw | Azimuth pointer body (H5C) | Bz. | Carries nut (H5E). Threaded singly 0.0823-inch pitch. |
| (H5L and H5M) | 2 | Sleeves | Extremities of screw (H5K) | G. S. | 1 right, 1 left; have micrometer graduations for reading hundredths of 1 degree. |
| (H5R) | 1 | Slide | Azimuth pointer body (H5C) | Bz. | Attached to nut (H5E) and to index (H5A). |
| | 1 | Taper pin | Collar (H5J) | G. S. | For securing collar and also sleeve (H5M). |

*Names of parts of 6-inch disappearing carriage, L. F., model of 1905, their piece marks, location, and material of which they are made*—Continued.

ELECTRICAL EQUIPMENT, MODEL OF 1905.

| Piece mark. | Number. | Name of part. | Location. | Material. | Remarks. |
|---|---|---|---|---|---|
| (V5G2) | 1 | Base | Terminal box (V5E2) | Slate. | 15,375 by 6.125 by 1. |
| (P45A1) | 1 | Battery box | Under sighting platform | Oak. | Boiled in paraffin. |
| (P45B2) | 1 | Battery-box connection | Secured to outside of battery box | Bz. | Serve to join branches of firing lever to battery. |
| (T25B) | 1 | Bolt with nut | For bracket (T25A2) | S. | |
| (T25BE) | 2 | Bolts with nuts | For strap (T25BD1) | S. | |
| (T25K) | 1 | Bolt with nut | For pipe clamp (T25J) | S. | |
| (P45U1) | 2 | Bolts with nuts | Battery box to bracket | S. | |
| (P45W) | 2 | ....do | Battery box connection (P45B2) to battery box (P45A1). | S. | Countersunk with washers under nuts. |
| (T25BG) | 4 | ....do | For strap (T25AE) | S. | Countersunk. |
| (V5R) | 2 | Bolts, expansion | For strap securing flexible hose to emplacement. | S. | 12 inches long, 0.875 inch diameter. |
| (V5AB) | 12 | Bolts, special | Base (V5G2) of terminal box | Bz. | 3 nuts and 2 washers each. |
| (V5M) | 2 | Bolts, tap | For strap encircling flexible hose and securing it to concrete. | S. | |
| (V5V) | 10 | ....do | Securing cover (V5F) and flange (V5H1) to terminal box (V5EZ). | S. | |
| (V5X) | 4 | ....do | Terminal box to base ring | S. | |
| (T25BL1) | 2 | ....do | For junction box (T25BJ) | S. | |
| (T25C) | 29 | ....do | For straps (T25E1), (T25AE), (T25BW), and (T25BN); shades (T25L1), (T25BT1); pipe clamp (T25J); bracket (T25A2). | S. | |
| (P45K) | 18 | ....do | For straps (P45Q), (P45R), and (P45S) | S. | |
| (T25M) | 1 | Bracket | For azimuth pointer lamp | Bz. | |
| (T25A2) | 1 | ....do | Secured to piston-rod beam for supporting forward end of flexible hose (V5AQ). | S. | |
| (T25AL) | 6 | Bushings | For 0.5-inch conduit | | Commercial. |
| (P45M3) | 12 | ....do | Terminals of firing circuits | H. R. | |
| (T25AQ) | 1 | Cap | Lamp fitting (T25AM) | Bz. | |
| | 6 | Cells, dry battery | Battery box (P45A1) | | O. K. No. 4 or Columbia. |
| | 5 | Cell connections | ....do | | Insulated wire. |
| (T25J) | 1 | Clamp, pipe | Near elevation scale lamp | S. | |
| | 8 ft. | Conductor, No. 16 gauge | Portable lamp | C. | Insulated. |
| | 7 ft. | Conduit, flexible | ....do | S. | Commercial. |
| (V5AW) | 2 | Coupling nuts | Flexible hose (V5AQ) | Bz. | |
| (T25AN) | 1 | Coupling | Lamp fitting (T25AM) | Bz. | |
| (T25BC) | 1 | ....do | Portable lamp | Bz. | |
| (T25S) | 3 | Couplings | 2-inch pipe conduit in counterweight well | M. I. | Right and left. |
| (T25T) | 8 | ....do | For 0.5-inch conduit | M. I. | Do. |
| (T62D) | 5 | ....do | For 1.25-inch conduit | M. I. | Do. |
| (V5F) | 1 | Cover | Terminal box (V5E2) | C. I. | |

| | | | | | |
|---|---|---|---|---|---|
| (T25V) | 5 | Elbows | For 0.5-inch conduit | C. I. | |
| | 5 | Firing circuit, branches of | Connect electrical firing apparatus, 14-5-45 | | Made up of terminals, insulated wire, and flexible conduit. |
| (T25AM) | 1 | Fitting, lamp | Elevating scale | C. I. | |
| (T25BB) | 1 | Follower | Portable lamp | Bz. | |
| (T25BK) | 1 | Gasket | Junction box (T25BJ) | S. R. | |
| (T25AZ) | 1 | do | For hood (T25AY) | S. R. | |
| (T25AW) | 1 | do | Portable lamp | S. R. | |
| | 1 | do | For cover (V5F) | V. F. | |
| (T25BA) | 1 | Gland | Portable lamp | Bz. | |
| (P45F) | 1 | Ground connection | On gun | S. | |
| (P45V1) | 4 | Hasps and hooks (complete) | Battery box (P45A1) | Br. | |
| (T25AY) | 1 | Hood | Portable lamp | Bz. | |
| (V5AV) | 2 | Hose fitting | For flexible hose | Bz. | |
| (V5AQ) | 1 | Hose, flexible metallic | Counterweight well | S. | |
| (T25BJ) | 1 | Junction box and cover | On racer in front of rear transom | C. I. | |
| (T25AF1) | 1 | Junction box | Under right chassis | C. I. | Sprague Electric Co., No. 2592. |
| (T25AG) | 1 | do | On front of left chassis | C. I. | Sprague Electric Co., No. 2541. |
| (T62B) | 1 | do | Outside of left chassis | C. I. | Do. |
| (T62C) | 1 | do | Outside of right chassis | C. I. | Do. |
| (T25AK) | 3 | Lamp (16 candlepower) | On chassis and top carriage | | Commercial. |
| (T25AS) | 2 | Lamp (8 candlepower) | Azimuth and elevation pointer | | Do. |
| | 1 | Lamp, portable water-tight | Hung from front transom | | United States Navy. |
| (P45Y) | 12 | Lugs | For battery box | C. | For cell connections. |
| (V5AN) | 12 | Marking plates | For terminal box | Br. | |
| (T25AA) | 9 | Nipples, short | For 0.5-inch conduit | W. I. | |
| (T25AC) | 4 | Nipples, long | do | W. I. | |
| (T25Y) | 1 | Nipple, chase | do | | Western Electric Co., No. 5056. |
| (T25Z) | 1 | Nipple, close | do | W. I. | |
| (T62A) | 2 | Nipples, close | For 0.375-inch conduit | W. I. | |
| (T62E) | 2 | Nipples, short | For 1.25-inch conduit | W. I. | Right and left. |
| (T62F) | 1 | Nipple (3 inches long) | do | W. I. | Do. |
| (T25X) | 1 | Nipple, short | For 2-inch conduit | W. I. | Do. |
| (P45C1) | 2 | Nipples | For battery-box connections (P45B2) | Bz. | |
| (V5AC) | 36 | Nuts, special | For base of terminal box | Bz. | |
| (T25AR) | 1 | Nut | For lamp fitting (T25AM) | Bz. | |
| | 2 | Nuts | For bolts (P45W) | S. | For battery-box connection. |
| (P45H) | 10 | do | For swivel (P45G1) | Bz. | |
| | 1 | Packing | For battery box | F. | Between cells in sections. |
| | 24 | Pins | In terminal box | Br. | For marking plates (V5AU). |
| | 1 | Pin | For pipe fitting (V5S1) | S. | |
| | 1 | do | For terminal-box fitting (V5S1) | S. | |
| | 1 | Pipe | From junction box (T25AG) to return bend (T25AX). | W. I. | 0.5-inch insulated. |
| | 1 | do | From junction box (T62B) to junction box (T25AG). | W. I. | Do. |
| | 1 | do | From junction box (T25AF1) to shade (T25D2). | W. I. | Do. |
| | 1 | do | From junction box (T25BJ) to shade (T25L1) | W. I. | Do. |
| | 1 | do | From junction box (T25BJ) to lamp fitting (T25AM). | W. I. | Do. |

*Names of parts of 6-inch disappearing carriage, L. F., model of 1905, their piece marks, location, and material of which they are made*—Continued.

ELECTRICAL EQUIPMENT, MODEL OF 1905—Continued.

| Piece mark. | Number. | Name of part. | Location. | Material. | Remarks. |
|---|---|---|---|---|---|
| (P45H) | 1 | Pipe | From junction box (T25BJ) to junction box (T62B). | W. I. | 0.5 inch insulated. |
|  | 1 | do. | From junction box (T25AG) to resistance box. | W. I. | Do. |
|  | 1 | do. | From resistance box to dimmer | W. I. | Do. |
|  | 1 | do. | From junction box (T25AF1) to coupling (T62D). | W. I. | 1.25-inch insulated. |
|  | 1 | do. | From coupling (T62D) to junction box (T25BJ). | W. I. | Do. |
|  | 1 | do. | From junction box (T25BJ) to coupling (T62D). | W. I. | Do. |
|  | 1 | do. | From coupling (T62D) to outlet box | W. I. | Do. |
|  | 1 | do. | From flexible metallic hose to coupling (T25S). | W. I. | 2-inch insulated. |
|  | 1 | do. | From coupling (T25S) to coupling (T25S) | W. I. | Do. |
|  | 1 | do. | From coupling (T25S) to junction box (T25AF1). | W. I. | Do. |
| (V5S1) | 1 | Pipe fitting | On flexible metallic hose | Br. |  |
| (T25W) | 1 | Pipe plug | For conduit | C. I. | 0.5-inch. |
| (V5AL1) | 1 | Plate | In terminal box | S. Br. |  |
| (P45T) | 10 | Plugs | In branches of firing circuit | Bz. |  |
| (T25AU) | 2 | Receptacles | For candelabra lamps |  | Commercial, Gen. Elec. 125V., ½ amp. |
| (P45P1) | 10 | do. | In branches of firing circuit | Bz. |  |
| (T25G) | 1 | Reflector 1 shell | In reflector | S. |  |
|  |  | 1 bushing | do. | V. F. |  |
|  |  | 1 end | do. | S. |  |
|  |  | 1 support | do. | S. |  |
|  |  | 2 rivets | do. | S. |  |
| (T25P) | 1 | do. 1 shell | do. | S. | Seamless tubing. |
|  |  | 1 end | do. | S. |  |
|  |  | 1 bracket | do. | S. |  |
|  |  | 3 rivets | do. | S. |  |
| (T25AX) | 1 | Return bend | On front transom | M. I. | Open pattern. |
|  | 1 | Rubber pad | In terminal box | S. R. |  |
| (T25H) | 2 | Screws | For reflector (T25G) | S. |  |
| (T25R) | 3 | Screws, button head | For reflector (T25P) | S. |  |
| (T25N) | 2 | Screws | For bracket (T25M) | S. |  |
| (T25Q) | 2 | do. | For reflector (T25P) | S. |  |
| (V5AK) | 4 | Screws, R. H. | In terminal box (V5E2) | Br. |  |
| (V5T) | 2 | Screws | For rubber pad | Bz. |  |

| | | | | | | |
|---|---|---|---|---|---|---|
| (T25D2) | 2 | Shades | 2 shells | In shade | S. S. | On chassis. |
| | | | 2 ends (closed) | ....do | S. S. | |
| | | | 2 ends (with holes) | ....do | S. S. | |
| | | | 2 brackets | ....do | S. | |
| | | | 2 thumbscrews | ....do | S. | |
| | | | 2 thumb nuts | ....do | Bz. | |
| | | | 16 rivets | ....do | S. | |
| (T25L1) | 1 | Shade | 1 shell | ....do | S. S. | On rear transom. |
| | | | 1 end (closed) | ....do | S. S. | |
| | | | 1 end (with holes) | ....do | Bz. | |
| | | | 1 support | ....do | S. | |
| | | | 9 rivets | ....do | S. | |
| (T25BY) | 2 | Sleeves | | For junction box (T25BJ) | C. I. | |
| (P45J1) | 10 | ....do | | In branches of firing circuit | Bz. | |
| (T25AV) | 2 | Snap switch | | On portable lamp | | Commercial, single pole, 5 amp., 220V., closed base. |
| (P45N1) | 12 | Sockets | | In branches of firing circuit | Bz. | |
| (T25AJ) | 3 | Sockets, key | | For 16-candlepower lamps | | Commercial, Edison base, tapped for 0.375 pipe. |
| (T25AP) | 1 | Socket | | For candelabra lamp | V. F. | |
| (T25AT) | 2 | Springs | | For electric lamp | Sp. S. | |
| (V5L) | 1 | Strap | | For 2-inch flexible metallic hose | S. | |
| (V5U) | 1 | Strap, base | | ....do | C. I. | |
| (T25AE) | 13 | Straps | | For 0.5-inch conduits | S. | |
| (T25BD1) | 1 | Strap | | For portable lamp | S. | |
| (T25BN) | 2 | Straps, pipe | | For 1.25-inch conduit | S. | |
| (T25BN) | 1 | Strap | | For lighting cables | Flange.<br>S. | On sight arm brackets. |
| (T25E1) | 3 | Straps | | For 2-inch conduits | S. | |
| (P45Q) | 13 | ....do | | For firing circuit | S. | |
| (P45R) | 1 | Strap | | ....do | S. | |
| (P45S) | 2 | Straps | | ....do | S. | |
| (T25BF) | 1 | Strap | | On sight standard | S. | For 0.5-inch conduit. |
| (P45G1) | 10 | Swivels | | For branches of firing circuit | Bz. | |
| (T25U) | 1 | Tee | | At junction box (T25AF1) | M. I. | |
| (V5AA1) | 24 | Terminals | | In terminal box | C. | |
| (V5E2) | 1 | Terminal box | | In counterweight well | C. I. | |
| (V5J1) | 1 | Terminal box fitting | | In bottom of terminal box | Bz. | |
| | 2 | Terminal connections | | In battery box | Insulated wire. | No. 14, B. and S. |
| | 2 | Washers | | For rubber pad | Bz. | In terminal box (V5E2). |
| (V5AD) | 24 | ....do | | For terminals | Bz. | |
| (P45AA1) | 12 | ....do | | In branches of firing circuit | H. R. | |
| (P45X) | 2 | ....do | | For battery-box connection | S. | |
| | 1 | No. 14 wire | | For firing circuit | C. | Insulated, about 80 feet. |
| | 1 | ....do | | For lighting circuit | C. | Insulated. |

*Names of parts of 6-inch disappearing carriage, L. F., model of 1905, their piece marks, location, and material of which they are made*—Continued.

### FIRING PISTOL.

| Piece mark. | Number. | Name of part. | Location. | Material. | Remarks. |
|---|---|---|---|---|---|
| (P39D1) | 1 | Binding bolt | In spring insulation (P39H3) | Br. | |
| (P39J) | 1 | Binding post | Buzzer board | Br. | |
| (P39S) | 2 | Binding-post cables | From binding bolt (P39D1) and from binding stud (P39AB) to binding post (P39J). | C. | Insulated. |
| (P39W2) | 2 | Binding-post screws | Binding post (39J) | S. | |
| (P39AB) | 1 | Binding stud | Spring insulation (P39H3) | Br. | |
| | 1 | Bolt, tap | For bracket (A4B1) | S. | |
| | 1 | Bolt, special tap | do | S. | |
| (P39F1) | 2 | Bolts, tap | 1 in magnet header (P39AE); 1 in spiral (P39AJ1). | Br. | |
| (P39Z2) | 2 | Bushings | For terminals | H. R. | Screwed into pistol cover (P39A1). |
| (P39AK2) | 1 | Buzzer | Pivoted below magnets | | Made up of bushings of vulcanized fiber, 2 steel rivets, 1 brass buzzer handle, 1 brass hammer, 1 armature of magnet iron, and 2 brass rivets. |
| (P39AS2) | 1 | Buzzer board | Secured to pistol cover | M. M. | 2.656 by 2.5 by 0.625 inches. |
| (P39AQ1) | 2 | Buzzer-board nuts | Molded in front edge of buzzer board (P39AS2) | Br. | |
| (P39AP1) | 2 | Buzzer-board screws | Engage in buzzer-board nuts, through pistol cover. | Br. | |
| (P39AC) | 1 | Buzzer frame | Below magnets | Br. | Supports buzzer pivot (P39AH). |
| (P39AL1) | 1 | Buzzer-frame bolt | Extends through magnet header (P39AE) to buzzer frame (P39AC). | Br. | |
| (P39V1) | 1 | Buzzer-frame screw | Passes through buzzer board and engages in buzzer frame (P39AC). | S. | |
| (P39AH) | 2 | Buzzer pivots | In buzzer frame (P39AC) | S. | |
| (A4B1) | 1 | Firing pistol bracket | Bolted to front of shoulder rest | Bz. | |
| (P39AA1) | 2 | Magnet bars | In magnet spools (P39U3) | M. I. | |
| (P39AE) | 1 | Magnet header | Bolted to buzzer board (P39AS2) | S. I. | |
| (P39AR) | 2 | Magnet screws | Secure magnet header to magnet bar | S. | |
| (P39U3) | 2 | Magnet spools | Rest on buzzer frame | H. R. | |
| | 1 | Pin | For bracket (A4B1) | S. | Driven. |
| (P45C1) | 2 | Nipples | Surround bushings (P39Z2) | Bz. | |
| (P39N) | 2 | Pistol bolts | Top of pistol frame (P39C1) | Br. | Secure pistol frame to pistol cover. |
| (P39A1) | 1 | Pistol cover | Attached to firing-pistol bracket | Bz. | |
| (P39C1) | 1 | Pistol frame | Slides over pistol cover | Bz. | Pistol grip is formed on rear portion. |
| (P39AD2) | 1 | Push button | Seated in rear part of pistol frame above trigger. | Br. | |
| (P39AF) | 1 | Push-button gland | Retains push button in its seat | Br. | |
| (P39AG1) | 1 | Button push spring | Keeps push button in its rearward position | Br. | |
| (P39R1) | 1 | Resistance spool | Embedded in back of buzzer board | H. R. | |
| (P39B2) | 1 | Retaining catch | Riveted to front face of pistol cover, engaging firing pistol bracket. | S. | |

| | | | | | |
|---|---|---|---|---|---|
| (P39Q) | 1 | Screw, binding | Spiral (P39AJ1) | Br. | |
| (P39Y1) | 2 | Screws, contact | 1 in binding post (P39J); 1 in binding post (P39X). | S. | |
| (P39T1) | 2 | Screws, header | Secure magnet header (P39AE) to buzzer board. | S. | |
| (P39G) | 2 | Screws, spring insulation | Secure spring insulation (P39H3) to pistol cover. | Br. | |
| (P39AJ1) | 1 | Spiral | Secured to rear edge of buzzer board | S. | Has platinum contact tip. |
| (P39AM3) | 1 | Spiral screw | In spiral (P39AJ1) | Br. | Engages binding screw (P39Q) and spiral screw (P39AM3). |
| (P39AN1) | 1 | Spiral-screw nut | Embedded in buzzer board | Br. | |
| (P39H3) | 1 | Spring insulation | Secured in lower branch of pistol cover | M. M. | |
| (P39L2) | 1 | Trigger | Pivoted in rear portion of pistol frame | Bz. | |
| (P39M) | 1 | Trigger pivot | In rear portion of pistol frame | Br. | |
| (P39K) | 1 | Trigger spring | Secured to spring insulation by binding bolt (P39D1). | Br. | Platinized. |
| | 1 | Washer | Between binding bolt (P39D1) and pistol cover. | Micinite. | To completely insulate binding bolt. |
| | | Wire | Resistance spools | G. S. | To decrease current in testing firing circuit so as not to fire primer. |
| | | .....do | Magnet spools | C. | |

SAFETY FIRING SWITCH.

| | | | | | |
|---|---|---|---|---|---|
| (P30F) | 2 | Blades | Attached to lever (P42A) | C. | Are engaged between clips of safety firing switch clip base (32K). |
| (P30E) | 2 | Blocks | Between blades (P30F) and lever (P42A) | M. M. | 2.5 by 1.25 by 0.25 inches. |
| (P30S) | 6 | Bolts, tap | For covers (P30P and P42D1) | S. | |
| | 2 | Bushings | Lever base (23Z1) | Bz. | For handle (P42C). |
| (P30D) | 4 | .....do | Insulated blades (P30F) and clip blocks (P30J). | M. M. | |
| (P30J) | 2 | Clip blocks | Clip frame (P42E) | C. | |
| (P30G and P30H) | 4 | Clips | Riveted to extremities of clip blocks (P30J) | C. | 2 right, 2 left. |
| (P42E) | 1 | Clip frame | Riveted in bearing in clip base (23X) | C. I. | |
| (P42D1) | 1 | Cover | Secured to clip frame (P42E) | S. S. | |
| (P30P) | 1 | .....do | Bolted to stop (P42B) | S. S. | |
| (P42C1) | 1 | Handle | In bearing in lever base | F. S. | |
| | 1 | Key, jib | Lever (P42A) to handle (P42C) | S. | |
| (P42A) | 1 | Lever | Secured at one end to inner extremity of handle (P42C). | C. I. | Supports at one extremity blade (P30F). |
| (P30C) | 4 | Nuts | Secure clip blocks (P30J) and blades (P30F) | S. | |
| | 4 | Pins | Lever base (23Z1) | Bz. | For bushings. |
| | 2 | .....do | Secure stop to lever base (23Z1) | S. | Riveted. |
| | 2 | .....do | Riveted in clip frame (P42E) | S. | Secure clip frame to clip base (23X). |
| | 2 | .....do | Between blocks (P30E) and clip frame (P42E) and lever (P42A). | S. | 0.437 inch long. |
| | 4 | Rivets | Clip blocks (P30J) | C. | For securing clips (P30G) and (P30H). |
| (23Z1) | 1 | Safety firing switch lever base | Bolted to left chassis at center of carriage | C. I. | |

*Names of parts of 6-inch disappearing carriage, L. F., model of 1905, their piece marks, location, and material of which they are made*—Continued.

SAFETY FIRING SWITCH—Continued.

| Piece mark. | Number. | Name of part. | Location. | Material. | Remarks. |
|---|---|---|---|---|---|
| (23X) | 1 | Safety firing switch clip base | Bolted to under left side of top carriage in rear of lever base (23Z1) | C. I. | |
| | 1 | Split pin | For taper pin of lever (P42A) | S. | |
| | 4 | Split pins | For nuts (P30C) of blades (P30F) | S. | |
| (P42B) | 1 | Stop | Riveted in bearing in lever base (23Z1) | C. I. | |
| | 1 | Taper pin | Lever (P42A) | S. | For securing lever to handle (P42C). |
| (P45D1) | 1 | Terminal attachment | do | | For securing branches of firing circuit to blades (P30F). |
| (P45E2) | 1 | do | Clip base (23X) | | For securing wrenches of firing circuit to clip blocks (P30J). |
| (P30B) | 4 | Washers | Under nuts (P30C) | S. | |

SHOT TRUCK—4 PER CARRIAGE.

| Piece mark. | Number. | Name of part. | Location. | Material. | Remarks. |
|---|---|---|---|---|---|
| (A1J and A1K) | 4 | Angles | Front and rear vertical frames | S. | 2 right, 2 left, 1.5 by 1.5 by 0.187 inch angles. |
| (A1L) | 2 | do | Bolted to above main axle brackets (A1P) | S. | 1.75 by 1.75 by 0.187 inch angles. |
| (A1T) | 2 | do | Join angles (A1J and A1K) at top of truck | S. | |
| (A1U) | 2 | do | Connect angles (A1J and A1K) above caster wheels. | S. | 1.5 by 1.5 by 0.187 inch angles. |
| (A1P) | 2 | Axle brackets, main | At middle of truck 12.2 inches above the ground. | C. S. | Bolted between angles (A1L) and brace (A1R) and (A1S). |
| (A1C) | 1 | Axle, main wheel | Pinned to main axle brackets (A1P) | F. S. | |
| (A1X) | 4 | Bolts and nuts | Main axle brackets (A1P) | S. | |
| (A1R and A1S) | 4 | Braces | Join front and rear vertical frames to main axle brackets below the latter. | S. | 2 right, 2 left, 1.5 by 1.5 by 0.187 inch angles. |
| (A1B) | 2 | Bushings | Main wheels (A1A) | Bz. | |
| (A1E) | 2 | do | Caster wheels (A1D) | Bz. | |
| (A1Q) | 1 | Handle | Rear end of truck | A. | 22 inches long, riveted in place. |
| | 2 | Nuts | Extremities of main wheel axle (A1C) | S. | |
| (A1F) | 2 | Pins, caster wheel | Supported in bearings in lower ends of angles (A1J and A1K). | S. | 6.5 inches long under heads. |
| | 4 | Plugs, 0.375 oil | 1 for each wheel | Bz. | |
| | 4 | Rivets | Angles (A1L) to shot supports (A1G and A1H). | S. | 0.5 inch diameter. |
| | 30 | do | At various joints | S. | 0.375 inch diameter. |
| (A1G and A1H) | 2 | Shot supports | Top of truck | S. | 1 right, 1 left, 2 by 2 by 2.25 inch angles turned up at front and rear. |
| | 2 | Split pins | Secure caster wheel pins (A1F) | S. | |
| | 2 | do | For main axle taper pins | S. | |

| | | | | | |
|---|---|---|---|---|---|
| (A1M and A1N) | 2 | Stops | Riveted to shot supports (A1G and A1H) at rear ends. | S | 1 right, 1 left. |
| | 2 | Taper pins | Through main axle brackets (A1P) and main axle (A1C). | | |
| (A1W) | 2 | Tires | Caster wheels | V. R. | |
| (A1V) | 2 | do | Main wheel | V. R. | |
| | 2 | Washers | Outside of main wheels (A1A) | S. | |
| (A1D) | 2 | Wheels, caster | Front and rear of truck | C. S. | 5.9 inches diameter. |
| (A1A) | 2 | Wheels, main | At extremities of main wheel axle (A1C) | C. S. | 23.9 inches diameter. |

## SHOT TONGS, MODEL OF 1904—7 PER CARRIAGE.

| | | | | | |
|---|---|---|---|---|---|
| (A8N1) | 1 | Claw, inner | Opposite outer claw (A8P) | F. S. | In two parts. |
| (A8P) | 1 | Claw, outer | In two parts pivoted on center pin (A8T) outside of inner claw (A8N1). | F. S. | |
| (A8S) | 1 | Dog | Pivoted on center pin (A8T) outside of inner claw (A8N1). | F. S. | |
| (A8T) | 1 | Pin, center | Forms pivot of claws and dog | S. | |
| (A8Q) | 1 | Pin, shackle | In upper extremity of outer claw (A8P) | S. | |
| (A8R) | 1 | Shackle | Pivoted on shackle pin (A8Q) | F. S. | Engages upper extremity of inner claw (A8N1). |
| | 2 | Separators | Between two parts of outer claw (A8P) | S. | Riveted to claw. |
| | 3 | do | Between two parts of inner claw (A8N1) | S. | Do. |
| | 2 | Split pins | Ends of shackle pin (A8Q) | S. | |
| | 2 | do | Ends of center pin (A8T) | S. | |
| | 1 | Spreader | Outer claw (A8P) | S. | 6 inches long. |
| | 1 | do | Inner claw (A8N1) | S. | Do. |

## LANYARD ATTACHMENT.

| | | | | | |
|---|---|---|---|---|---|
| (A14E) | 1 | Case | Bolted to lanyard filling piece (23N) | Bz. | |
| (A14KA) | 2 | Case bolts with nuts | Case to lanyard filling piece | S. | 0.5 inch diameter by 1.5 inches long. |
| (A14N) | 1 | Case cover | Left side of case (A14E) | Bz. | 5.6 inches diameter, threaded 16 per inch in circumference. |
| (A14W) | 1 | Firing leaf cord | From firing leaf of breech mechanism to reel cord (A14R). | | Of Italian hemp. |
| | 1 | Firing leaf hook | Firing leaf cord (A14W) | S. | For attaching to firing leaf of breech mechanism. |
| (23L) | 1 | Lanyard cam | Bolted to elevating arm | Bz. | To prevent lanyard from being withdrawn while gun is out of battery. |
| (A14Q) | 1 | Lanyard cord | Attached to end of reel cord (A14R) | | Of Italian hemp, 35 feet long. |
| (23N) | 1 | Lanyard filling piece | Bolted to elevating band | Bz. | |
| (A14L) | 1 | Nut | On spring shaft (A14P) | S. | |
| (A14H) | 1 | Pawl | Pivoted at front part of case (A14E) | S. | |
| (A14D) | 1 | Pawl pin | At pivot of pawl (A14K) | S. | 1.35 inches long. |
| (A14J) | 1 | Pawl spring | Supported in case (A14E); acts against lower end of pawl (A14K). | S. | 1.1 inches free height, 0.3 inch diameter, helical. |

*Names of parts of 6-inch disappearing carriage, L. F., model of 1905, their piece marks, location, and material of which they are made*—Continued

LANYARD ATTACHMENT—Continued

| Piece mark. | Number. | Name of part. | Location. | Material. | Remarks. |
|---|---|---|---|---|---|
| (A14B) | 1 | Pin | Reel (A14F) | S. | For securing outer end of spring (A14K). |
| (A14M) | 1 | do | Spring snaft (A14P) | S. | Riveted in place for securing inner end of spring (A14K). |
| (A14F) | 1 | Reel | In case (A14E) | Bz | Carries reel cord (A14R). |
|  | 1 | Ring | Unites firing leaf cord, lanyard cord, and reel cord. | F. S. | Galvanized. |
| (A14R) | 1 | Reel cord | Wound on reel (A14F) |  | Of soft braided linen, 70 inches long. |
|  | 2 | Snap hooks | Join firing leaf cord and lanyard cord to ring |  | Commercial. |
| (A14K) | 1 | Spring | Inside of reel (A14F) | S. | Spiral, 0.625 inch wide. |
| (A14P) | 1 | Spring shaft | At center of case (A14E) | S. |  |
| (A14C) | 1 | Spring shaft pin | Through hub of case (A14E) and through spring shaft (A14P). | S. | Prevents spring shaft from turning under action of spring (A14K). |
|  | 1 | Thimble | Rear end of cord (A14R). |  | Commercial. |

GREASE CUP—8 PER CARRIAGE.

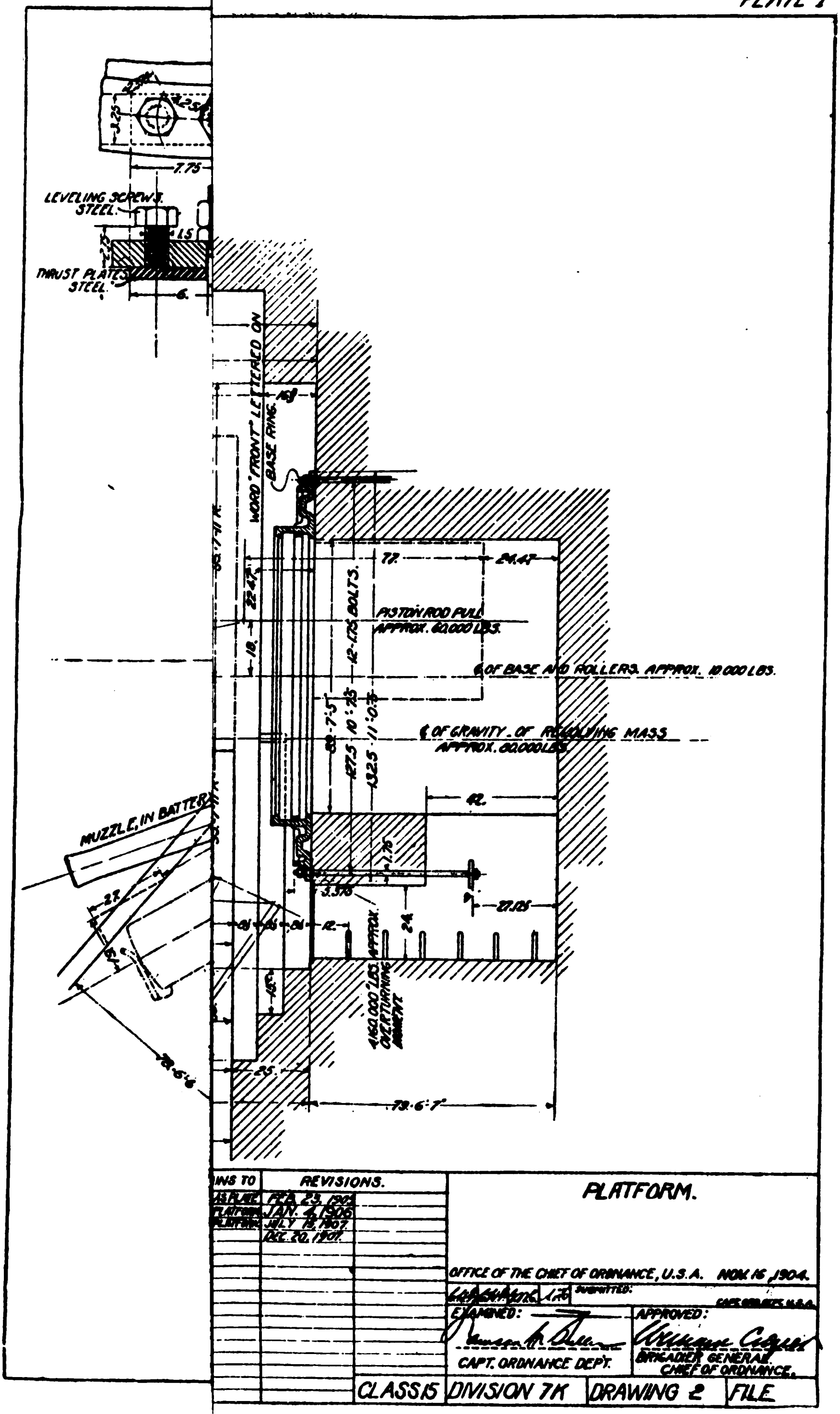
| Piece mark. | Number. | Name of part. | Location. | Material. | Remarks. |
|---|---|---|---|---|---|
| (A2A) | 1 | Body | Screwed into carriage | Bz. |  |
| (A2B) | 1 | Cap | On upper end of body (A2A) | Bz. |  |
| (A2D) | 1 | Cup leather | Underneath plunger |  | Of leather. |
|  | 2 | Gaskets | Between body (A2A) and oil pipe when grease cup is seated on pipe connection. | C. |  |
| (A2E) | 1 | Plunger | Inside of grease cup | Bz . |  |
| (A2G) | 1 | Plunger nut | Secures plunger to cap (A2B) | Bz. |  |
| (A2H) | 1 | Screw | Secures cup leather (A2D) to plunger (A2E) | Bz. |  |
|  | 1 | Split pin | For plunger nut (A2G) | S. |  |
| (A2F) | 1 | Spring | Between cap (A2B) and plunger (A2E) | S. | Of five coils, 552 pounds resistance when solid. |
| (A2C) | 1 | Washer | Under cup leather (A2D) | Bz. |  |

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ORDNANCE,
*Washington, October 29, 1908.*

FORM NO. 1703.
Ed. Aug. 27-17—500.

APR 4 1918

PLATE I



INS TO | REVISIONS.

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| AS PLATE | FEB. 23, 1905 |
| PLATFORM | JAN. 4, 1906 |
| PLATFORM | JULY 19, 1907 |
| | DEC. 20, 1907 |

PLATFORM.

OFFICE OF THE CHIEF OF ORDNANCE, U.S.A. NOV. 16, 1904.

SUBMITTED:

EXAMINED:

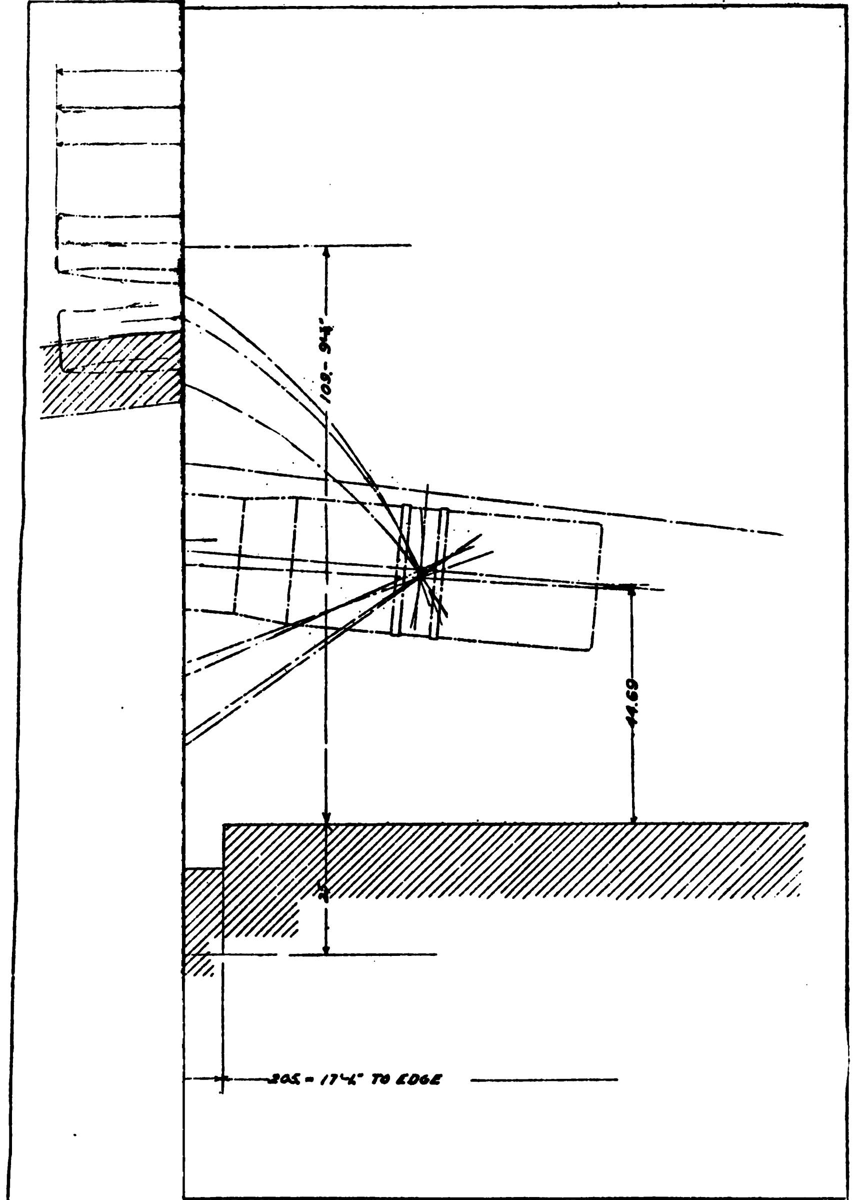
CAPT. ORDNANCE DEPT.

APPROVED:

BRIGADIER GENERAL. CHIEF OF ORDNANCE.

CLASS 15 | DIVISION 7K | DRAWING 2 | FILE

PLATE II



| PERTAINS TO | | | REVISIONS | |
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| | DIV. | AS PLATE | JULY 1, 1905.<br>NOV. 1, 1905.<br>MAR. 15, 1906.<br>JUNE 25, 1906.<br>OCT. 10, 1906.<br>DEC. 1, 1906.<br>JAN. 17, 1907.<br>MAR. 20, 1907.<br>JULY 15, 1907.<br>OCT. 10, 1907.<br>DEC. 20, 1907.<br>SEPT. 12, 1908. | |

### 6-INCH DISAPPEARING CARRIAGE.
### LIMITED FIRE.
### MODEL OF 1905.
### LONGITUDINAL SECTION.

FEB. 23, 1905.

SUBMITTED: J.R.H. C.E.B. G.W.C. C.W.F.

APPROVED:

William Crozier

BRIG. GEN. CHIEF OF ORDNANCE, U.S.A.

| CLASS 7 | DIVISION 12 | DRAWING 2 | FILE |
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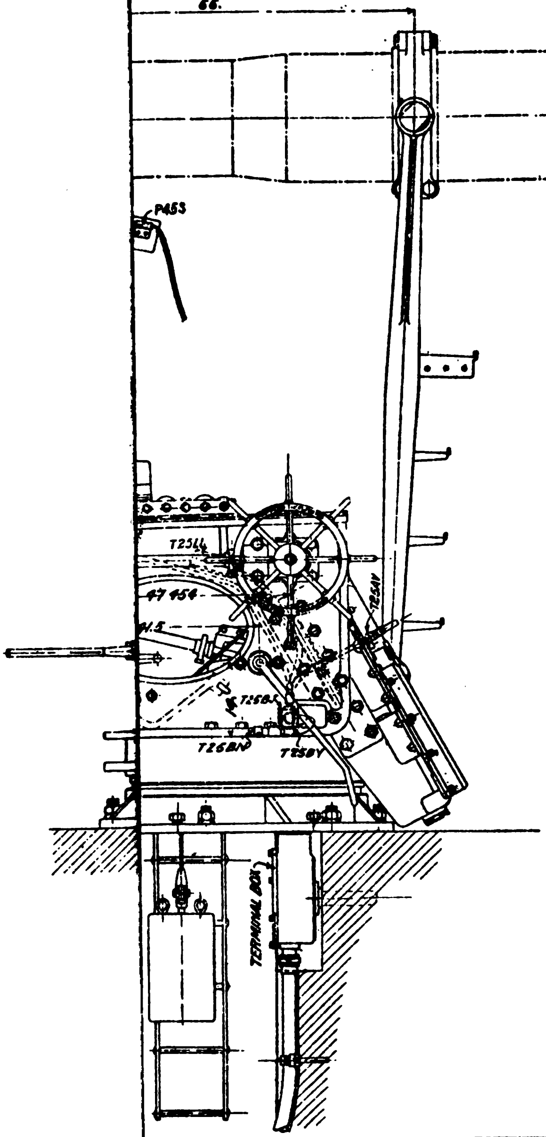

| PERTAINS TO | | REVISIONS | |
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| | | JULY 1, 1905. | |
| | | NOV. 1, 1905. | |
| | | JAN. 15, 1906. | |
| | | JUNE 25, 1906. | |
| | | OCT. 10, 1906. | |
| | | DEC. 1, 1906. | |
| | | JAN. 12, 1907. | |
| | | MAR. 28, 1907. | |
| | | DEC. 20, 1907. | |
| | | SEPT. 12, 1908. | |

## 6-INCH DISAPPEARING CARRIAGE.
## LIMITED FIRE.
## MODEL OF 1905.
## LEFT SIDE AND FRONT VIEW.

MAR. 20, 1905.

SUBMITTED: J.B.H. W.S.M. G.W.C. W.W.

APPROVED:

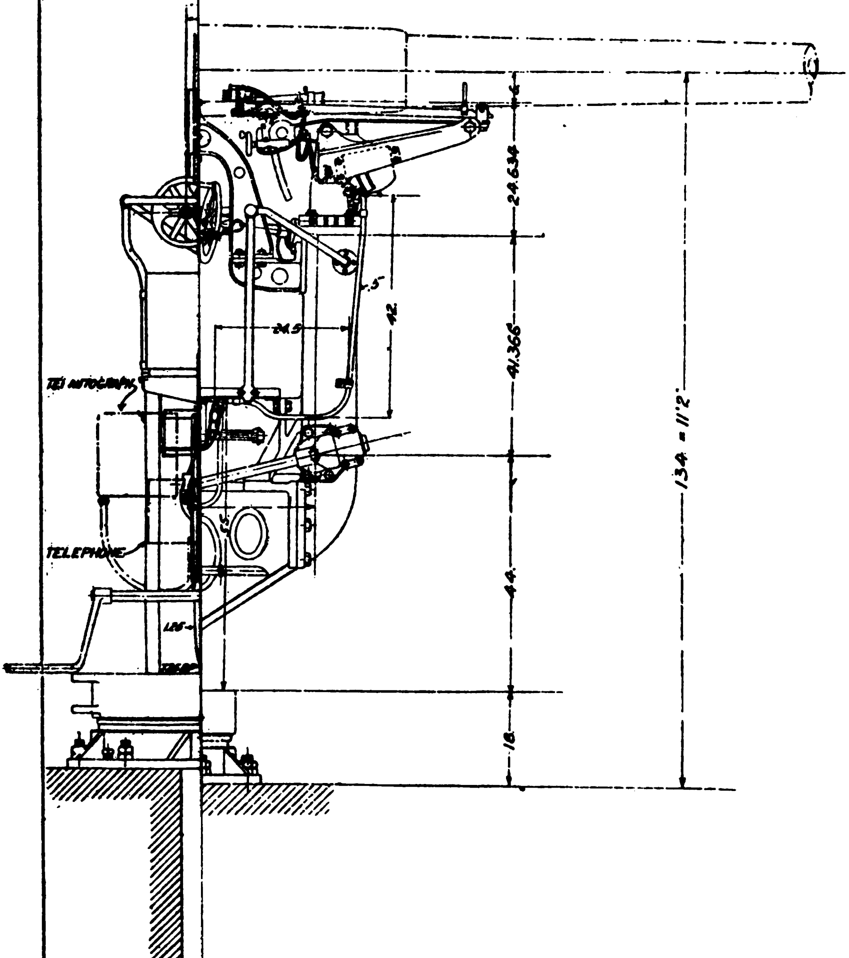
EXAMINED:

CAPTAIN ORDNANCE DEPARTMENT, U.S.A.

BRIG. GEN., CHIEF OF ORDNANCE, U.S.A.

CLASS 7 DIVISION 12 DRAWING 3 FILE

PLATE IV



| PERTAINS TO | | REVISIONS | |
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| | | APRIL 1, 1905. | |
| | | JULY 1, 1905. | |
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| | | JUNE 23, 1906. | |
| | | OCT. 10, 1906. | |
| | | DEC. 1, 1906. | |
| | | JAN. 11, 1907. | |
| | | DEC. 30, 1907. | |
| | | SEPT. 12, 1908. | |

6-INCH DISAPPEARING CARRIAGE.
LIMITED FIRE.
MODEL OF 1905.
RIGHT·SIDE AND REAR VIEW

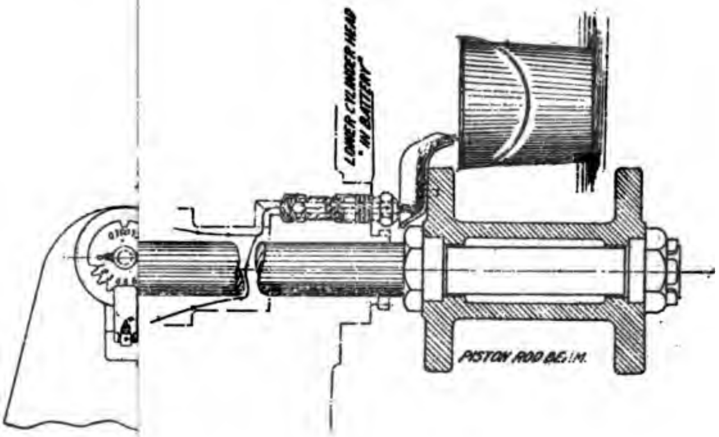
SUBMITTED J.B.N. G.K. [illegible] G.H.F.
MAR. 20, 1905.

APPROVED

CHIEF OF ORDNANCE, U.S.A.

CLASS 7 | DIVISION 12 | DRAWING 4 | FILE

PLATE V.



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METHOD OF CONTROLLING ENERGY OF RECOIL.
DISAPPEARING CARRIAGES WITH CYLINDER IN COUNTERWEIGHT.

OCT. 28, 1908.

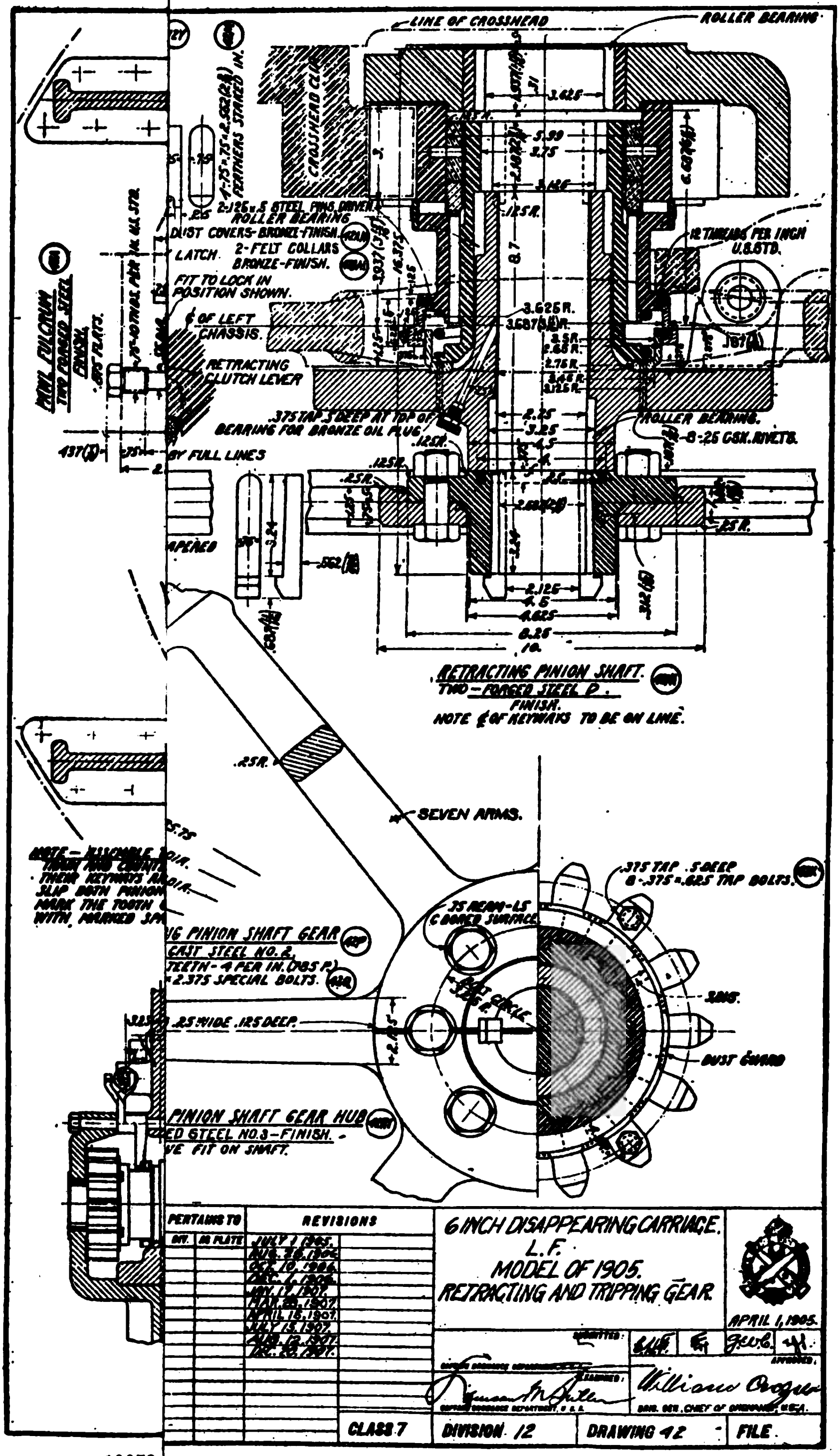
SUBMITTED:
MAJOR ORDNANCE DEPARTMENT, U.S.A.
EXAMINED:
MAJOR ORDNANCE DEPARTMENT, U.S.A.

R.R.S. | A.E.J. | RRS.

APPROVED: BY ORDER OF THE CHIEF OF ORDNANCE:
J. A. Rice
MAJOR ORDNANCE DEPARTMENT U.S.A.

CLASS 15 | DIVISION 0 | DRAWING 18 | FILE

## PLATE VI



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| | | JULY 1 1905. |
| | | AUG. 26, 1906. |
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| | | DEC. 6, 1906. |
| | | JAN. 17, 1907. |
| | | MAR. 26, 1907. |
| | | APRIL 15, 1907. |
| | | JULY 15, 1907. |
| | | AUG. 12, 1907. |
| | | DEC. 26, 1907. |

6 INCH DISAPPEARING CARRIAGE.
L.F.
MODEL OF 1905.
RETRACTING AND TRIPPING GEAR.

APRIL 1, 1905.

SUBMITTED:

EXAMINED:

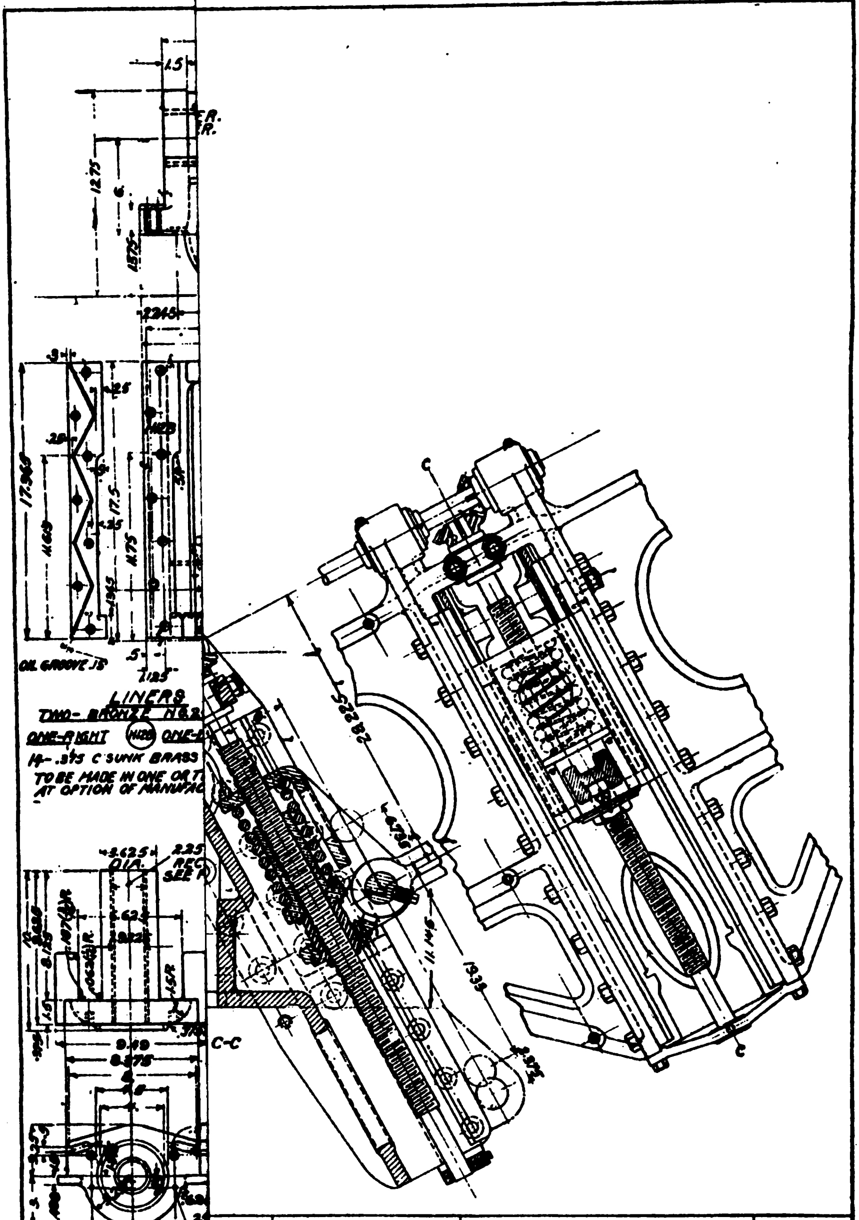
CAPTAIN ORDNANCE DEPARTMENT, U.S.A.

APPROVED:

William Crozier

BRIG. GEN. CHIEF OF ORDNANCE, U.S.A.

CLASS 7 DIVISION 12 DRAWING 42 FILE.



| PERTAINS TO | | REVISIONS | |
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| | IN PLATE | JULY 15, 1907. | |
| | XXIV | DEC. 20, 1907. | |
| | XXI | OCT. 10, 1908. | |

## ELEVATING MECHANISM AND DETAILS

APRIL 1, 1905.

SUBMITTED. Geo. H.W.R. G.W.S. C.H.H.

CAPTAIN ORDNANCE DEPARTMENT, U.S.A.

EXAMINED

CAPTAIN ORDNANCE DEPARTMENT, U.S.A.

APPROVED.

William Crozier

BRIG. GEN., CHIEF OF ORDNANCE, U.S.A.

| CLASS 15 | DIVISION 7K | DRAWING 12 | FILE |
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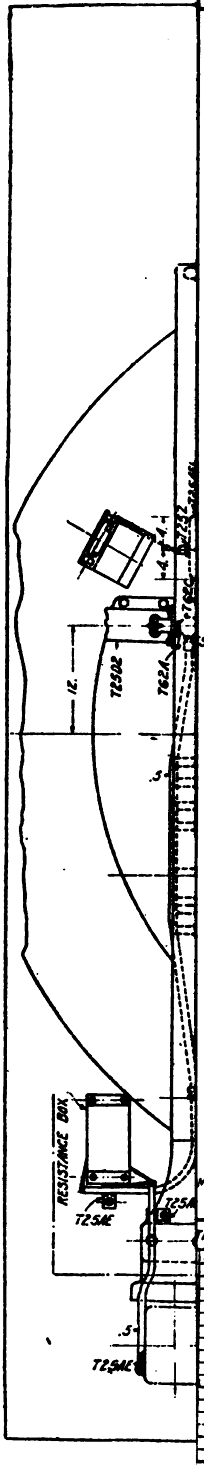
PLATE VIII



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| AS PLATE LI | MAR. 15, 1906<br>OCT. 10, 1906<br>DEC. 20, 1907<br>JAN. 23, 1909 | |

CONDUITS FOR
6 INCH DISAPPEARING CARRIAGE
L.F. MODEL OF 1905
PLAN AND WIRING DIAGRAM

NOV. 1, 1905

SUBMITTED:
MAJOR ORDNANCE DEPARTMENT U. S. A.
EXAMINED:
MAJOR ORDNANCE DEPARTMENT, U. S. A.

J.H.B. | J.M.L. | R.R.B.

APPROVED: BY ORDER OF THE CHIEF OF ORDNANCE
J. H. Rice
MAJOR ORDNANCE DEPARTMENT, U. S. A.

CLASS 14 | DIVISION 6 | DRAWING 62 | FILE